

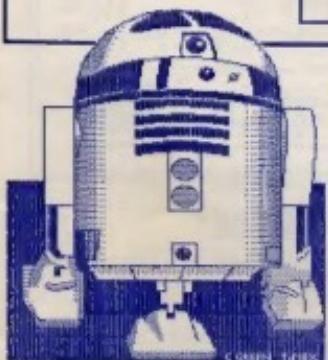
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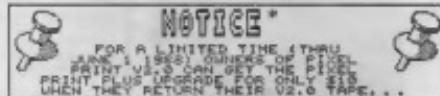


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MARCH/APRIL '88

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## FROM THE EDITOR'S CLUTTERED DESK

Tim Woods

Just as I had predicted in our last issue, my editorial entitled "SEND IN THE CLONES" opened a can of worms, but in a much more favorable light than I had anticipated. And, along with our on-going Reader Survey, the TDM Mail Box was literally bursting at the seams! Only one person, however, wrote to tell me that they had caught on to the what I thought was, an appropriate title. It's from a Judy Collins song that was made popular in the 70's—"Send In The Clones". That one person, was my good friend, the ever-talented Paul Bingham, who thought I should have included musical notes along with the title!

As it turns out, I now know (thank goodness) that probably won't be the last Sinclair user around. There are many, many of you who still feel that there is quite a bit of life left in these silver and black boxes. Others of you, it seems, due to professional commitments for whatever dabble with the more expensive machines, but still are very interested in what is going on here in TDM and the Sinclair community.

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Then finally, there are those of you who never intended to stay with us for very long anyway. The flashier "Bells and whistles" are just too much of a temptation. Please do us all a favor, and sell (or give) your Sinclair computer to someone who would use it...and also give them your back issues of TIME SESSIONS if you no longer want to read them.

Overall, I feel that "IBM PC and Clone bashing" would be an unproductive activity for us to follow. (But lord knows how many times we've heard our favorite machines bashed to death!) There is probably a great deal of info he could gain from our PC, Atari, Apple, and Commodore friends.

I closed the "Send In The Clones" editorial on a positive note...which I would like to expand on a bit. There are those of you who have accused me of being too positive (or "sugar-coated"). Of course I am aware of folks who have left our midst, and that some of the user groups have died on the vine. But I am equally aware of groups that are still "on fire" and can pack in 50 to 60 users at meetings, and also some fascinating research and development that is being conducted right now with our computers.

Why concentrate on "bells, whistles" and "crying" about how bad things are? Why not instead work together on some neat hardware and software projects. Let's recruit new members (and try to find those that have "hand-me-down" computers). Let's also try to turn around such negative bad mouthing we receive. By showing others what we can do...and start by having a positive attitude ourselves.

I don't mean to get up on a high and mighty soap box, but I am tired of hearing negative comments

Continued On Page 4.

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| C192 | TS2068 Intermediate/Advanced Guide   |
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| C231 | Powerful Projects with Your Timex/Sinclair   |
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| B101 | ZX81 Programming for Real Applications   |
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even from our own users). Often I have found that the root problem is frustration. There is so much that could be done by others in this area. If someone is frustrated, a simple question for questions answered goes a long way. More than often, it's simply showing a user how to install a printer code in a program to get their full size printer going, or explaining how a disk drive is hooked up, etc. Those of you who are "more knowledgeable"...we really need your help, if you are willing to take the time to explain something in layman's terms, or solve a problem.

Enough said for the time being on the subject. Before we run out of space, I did want to share with you what's coming up in TDM.

Our next issue's theme is **TIMEX SINCLAIR USERS GROUPS**. We'll try to provide the most update listing of groups in the U.S. and Canada that we know of, and also some international groups as well. We will also select the top ten newsletters produced by the TS groups (to give all those small time editor's a boost and encouragement). Along with the user group information, we will also list the details on a company that still supports the Timex Sinclair community. And if that hasn't all the May/June issue will have a complete TDM page index for the past four years of publication (this has been requested a lot)...plus all of our regular programs, articles, and features. Don't miss out (surprises as well)!!

Then for the Summer issue--July/August...that will be our issue devoted to **STORAGE MEDIA**. All about disk drives, program conversions, utilities, some of those "rare" Timex and Sinclair tape drives, and an excellent program by Floyd Chrysler who converted it from a published Spectrum program (with permission from the author) for the TS2066. It really speeds up things for those folks that still use tapes.

Moving on to the next section, I want to introduce you to Ralph Hammer, of Las Vegas, Nevada, who contributed a program called "CUST-J7" in the March/April '87 issue of TDM. Ralph is talented in many areas including the graphic arts. The upcoming

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USER GROUP issue is his "brain child", and he has designed a great looking cover for that issue. In addition to that, he will also be doing other art assignments from time to time. After twenty years in the Air Force, Ralph is facing retirement and a change of pace...we wish him the best of luck!

Now to kick things off for this issue, we have a number of guest editorials, letters, tips, and general mail...so we have elected to let Ralph Hammer go first. As always, we appreciate your comments and any correspondence is welcome. If you haven't filled out your READER SURVEY yet, there is still plenty of time (WHY HAVEN'T YOU??). Another copy of the survey is provided elsewhere in this issue. We will report on the survey findings next time. See you then!

## IN THE MAILBAG

### An Open Letter To The Readers

Every once in a while, Tim Woods (our Editor and Friends) will stand on a soap box, and declare his loyalty to the Timex-Sinclair community of computers. And for the larger percentage, we are right behind him. These little Z80-based computers are great to work with, and to have fun with.

A good number of people, be they common users, or up to the Dealers and the ones who keep us healthy, have stood the ground for our orphan. We putter and tinker around with these black and silver machines, making it work a little harder and a little better.

We have even banded together in small groups, meeting month after month, year after year, just for the simple pleasure of talking to someone who has a common interest--the Sinclair computer.

But I have started to notice a trend. There is a departing mode going on. People are leaving our midst, to "upgrade" to the Big Blue Compatible, and with them goes the little tidbits of invaluable information, and experience. I wish them good fortune, for they have polished their computing "Baby-teeth" on our beloved brand. But let's hang onto their phone number or address...

For the negative trend is also appearing, there are groups out there that are struggling, suffering from low membership and purpose. Some of us are tucking in our tails, hiding our pride.

Let's dust off that old ZX81, loan it to someone who doesn't compute. If it's been awhile since you ordered that one little piece of software, or bought a new Disk Drive, or a full size printer or monitor, scrap your pennies together and assault your dealers (they'll love ya for it!). Bring a non-TS user to your next group meet.

The time has come to start up a "National TEAM Organization". To think of its potential is mind-boggling. A whole continent of ideas, help, and service. Working together for standardization, software and hardware implementation, and even a logo to show our unity.

Think about it, and then take action.

Ralph Hammer  
Sec/Treas.  
Timex-Sinclair Users Group  
of Las Vegas, Nevada

### Guest Editorial: The "Sleeper Has Awakened"

If you are a "DUNE" fan (as I am), you may have recognized that the title for this editorial was taken from that book (and movie)! But, that is exactly how I feel...now that I finally broke down and bought a Disk Drive System for my T820d8. That's right, all the progress development that I have been doing...Desktop Publisher and all, was 100% TAPE based! Thinking back, I shudder at the thought of all the wasted hours doing tape loads/saves and verifies. How did I even stand it?

Oh, I know you've heard all this before...I was skeptical too! Why would anyone want to spend so much money on a "dead" computer...how much longer is that little grey box going to work anyway...why not spend the money and get a real computer...all very good questions!! All these long

more! I asked myself for the better part of 4 years now, I guess it took me that long to find the answer: BECAUSE I WANT TOO! That is what it all boiled down to. This little grey box is a REAL computer, not a toy! The simply fantastic programs available make it a great enough for that. My little grey box has been going 20 to 30 hours per week, week after week, for 4 years...and when this one dies, I'll dig out my spare, and when that one goes, I'll have had time to get a second spare...all for a lot less money than one of their "real computers". And how reliable is Big Blue (or a C120) anyway?

But what really sold me was the new possibilities available with the disk system. The Aerco Disk Drive System has 64K of extra memory built into the interface, that is expandable. The Larken RAMdisk provides a second form of add-on capabilities, and can use the Aerco 64K as a RAMdisk without adding anything to the system. In each case, the MEMORY BARTRON is broken!

My new desktop program (Pixel Print Professional) uses the Aerco RAM to BANK-SWITCH a second Pixel Print column, allowing the user to load and switch between left and right columns in the Desktop Program. The "Print-a-Dокумент" program (part of the same package) uses BANK-SWITCHING to hold and print both left and right columns simultaneously! This provides perfect column alignment in the twin 132 character columns, and allows real 44 column desktop Publishing and reporting files from TABWORD or other word processors that create ASCII text files, in the single 44 column format. The LARKEN version will use the RAMDISK to hold file data and provide fast data transfer similar to the Aerco Bank-Switching. Volatile or non-volatile Ram cartridges can provide quick and easy add-on memory for tape and microdrive users too.

As the add-on memory systems become more popular, watch for more and more programs to be written to use these capabilities! Certainly the desktop programs are only one of many new applications that will take advantage of this new breakthrough!

So, wake up your computer and do what your inner self has been wanting to do for a long time now...send in that disk drive order, you won't regret it!! (For your information, I have compiled a short list of LOAD times for a variety of programs I use regularly. These times are for comparison purposes only...like government MPG figures...but somewhat more accurate!)

S. D. Lemke  
Leake Software Development  
Wichita, Kansas

| Timex AERCO DISK vs. CASSETTE load time<br>1 time in seconds! |       |          |
|---|-------|----------|
| Program   | AERCO | CASSETTE |
| Pixell Print v2.2   | 8.17  | 93.75    |
| TABWORD II  | 7.89  | 116.75   |
| On-File<br>with printer driver<br>and trivial data files!     | 14.35 | 298.75   |
| TIMACHINE   | 26.55 | 328.75   |
| Pixel Print Beta  | 4.60  | 111.75   |

I was very pleased to receive the JAN/FEB issue of TDM magazine and see your questionnaire on what track you should be taking. For myself, I am interested only in articles concerning T/S equipment from TDM; that is, if I wanted articles about IBM, I would seek out national publications or their user groups which are quite strong as we all know.

As to why I am interested in T/S, I purchased an on the PC3300 is T81000 clone, and through the Dallas Times User Group, changed very quickly to a model T8206B. I am a working engineer (1980 vintage) where in my job I have access to and use daily, a nation wide IBM network system operating five 3090 machines with operating systems of MVS, VM/CMS, and TS/OS these are networked via a high capacity data transfer system to our scientific computer center where we use VAX, CDC, and CRAY mainframes. The present CRAY XMP14 is being replaced in March with an XMP28. These machines will compile a 10,000 line Fortran program in about 1 second. My department software is being moved to the CRAY, and we will use a VAX 8800 as the front end of this system. So for many years I did not want any kind of PC in my home, but after buying a Radio Shack TRS-80 Pocket Computer at a camera fair, and being exposed to BASIC on it...then along came the PC3300. The T/S User Group recommended the T8206B, and when a T/S user went to Atari, I wound up with a T8206B, T82040 printer, quite a bit software and since then I have added two disk drives with the ARMD operating system, John McHugh's Commodore printer and lots of software from the SINCUS News Exchange Program.

Tim, we all wish you well in the magazine, and realize that the orphan will never be a roaring success, but the only reason I subscribe to TDM is the fact that it is a good source of T/S information and I do not have to sift through many unrelated articles. I actually would prefer a magazine devoted to only the T8206B, but know this is not practical (and many of the earlier programs for the T81000/T81500/T8201) can be utilized fairly readily if you have an interest.

John D. Austin  
McKinney, Texas

#### Puzzle Of The Month Fan

If King Xerxes of the JAN/FEB "Puzzle of the Month" could afford to have over 40 wives, he obviously could afford a computer. (Probably a Zorba!) We have to ask why he needed the last hint to determine the number of animals brought to him.

From Cedric Eastman's program, we know there are two possible solutions, one with 46 wives and one with 52 wives. Let's assume the king had 46 wives. I'm sure an old hacker like Xerxes wrote a program similar to Cedric's. There would be a loop. Before he received the last hint, he wouldn't yet know the number of oxen was less than half the total (this was the final hint), but he would know that the total of all the animals was equal to 46. To see what the king's earlier programs must have looked like, change one line in Cedric's program. Instead of the AND 0 (M/20) in line 65, use AND 46. The rest of the program can stay unchanged. Run the program. You'll get exactly one answer. If Xerxes had 46 wives, he would have had the answer without asking for the final clue. So we can assume he didn't have 46 wives, and the solution totalling up to 52 is the only correct one. I hope that Xerxes wasn't a complete computer nerd who spent all his time on his machine. Can you imagine 82 computer wimmen?

This is a great puzzle because it requires both computer and human analysis. I came across this puzzle at the perfect time...reading TDM on the way to work! That day, my boss didn't come in, so I had all day to work on it. Since I'm not sure if my boss or anyone in his family reads this magazine, I'd better sign off as...

Name Withheld  
Upon Request

I have to believe that I am not alone in my resistance to upgrading to a new computer every two years. It is not the cost--I have plenty invested in my ZX81 systems. I just feel that I could spend the next decade or so exploring all the possibilities of the unit with various hardware and software improvements available.

The ZX81 is, I feel, the perfect "base" from which to explore the world of the computer and the Z80 microprocessor. In a recent letter from Fred Nachbaur (Silicon Mountain Computers), Fred sums it up much better than I ever could. Allow me to quote: "I can't help but wonder, though, if one day the simple computer won't reappear. It seems that the whole computer industry is shooting itself in the foot by coming out with fancier computers at lower and lower prices. Already it's at a point where the best you can hope for with some of the new machines is to become a capable user. Forget about trying to understand it. At least with the ZX81 one stands a chance of learning what makes it go."

Van S. Vangor  
Bethlehem Tool  
Island Falls, Maine

#### Timex/Sinclair--"The Real Thing"

I called a man up just the other day, "I'd like a power supply," I had to say. "For a disk drive on my 2068." He replied, "Forty dollars."

I said, "Hey, that's GREAT!"

But then he went on to say, "What could it do?" I sat back and smiled and said, "How about you?" "Oh, I started with *Alphera*."

He said with dismay,

"But look around now, where are they today?" Too small and too slow and not much real use there. So they sit in my closet, under the stair."

"For just a few bucks you can buy an XT!" Having used them before I stated, "Oh, gee." "Move up to a machine you can DO SOMETHING with, And you can *SAVE* all kinds of bucket IF You build it yourself, it'll be QUITE a machine. With CP/M and MS-DOS, you can have a custom dream!"

"Why thank you," I said, "I'll keep it in mind. And give ya' a call if I can find the time." But laughing quite loudly as I hung up the phone, I thought, "I've got the REAL THING, who NEEDS a CLOSET!"

Clint Cook  
Santa Fe, California

#### ZEUS UTILITY Revisited

In the MAY/JUNE '87 issue of TDM, we published a short T8206B utility by Richard Hurd, that converts ZEUS source code files into an ASCII file for either MDS/SCRIPT and TABWORD Two. Evidently, there were some problems with the original listing. Here is the corrected version, including step-by-step instructions.

```
1) LOAD ZEUS (assembler) CODE
2) Enter this little BASIC listing

 5 REM HERE TO ENTER CODES
 10 LET T=0
 20 FOR F=614491 TO 61624
 30 IF T>0 THEN PRINT F:LET T=0
 40 INPUT N
 50 POKE F,N:PRINT TAB T:N;
 60 LET T=T+1:IF T>29 THEN PRINT:LET T=0
 70 NEXT F
 80 END
```

```

110 LET T=0
120 FOR #=61431 TO 61624
130 IF T>0 THEN PRINT F:LET T=T+6
140 PRINT TAB 7:PEEK F:
150 LET T=T+6:IF T>29 THEN PRINT:LET T=-
160 NEXT F

```

3) Now enter the list of 194 bytes of code I've included.  
 GAVE this along with the names list from ZEUS (416  
 Bytes) as "Z\_P\_M/T" CODE 61815,610

4) Just add this code to the BASIC listing from the TDM  
 article and you have it.

ZMM/T

```

61431 33 8 128 17 79 189
61437 35 96 126 204 19 40
61443 41 254 129 10 47 254
61449 8 48 4 10 13 24
61455 238 62 13 18 35 19
61461 126 254 256 22 77 36
61467 126 254 256 48 78 43
61473 62 237 186 32 215 62
61479 258 187 48 59 24 288
61485 38 78 62 33 18 19

```



|       |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|
| 61491 | 16  | 252 | 24  | 199 | 283 | 191 |
| 61497 | 14  | 8   | 239 | 33  | 87  | 238 |
| 61503 | 195 | 48  | 18  | 245 | 35  | 126 |
| 61509 | 254 | 8   | 48  | 6   | 254 | 18  |
| 61515 | 48  | 2   | 24  | 244 | 241 | 12  |
| 61521 | 32  | 24  | 235 | 126 | 18  | 35  |
| 61527 | 126 | 19  | 254 | 8   | 48  | 6   |
| 61533 | 254 | 18  | 48  | 2   | 24  | 241 |
| 61539 | 228 | 24  | 182 | 231 | 17  | 79  |
| 61545 | 182 | 167 | 237 | 82  | 239 | 193 |
| 61551 | 285 | 176 | 188 | 112 | 186 | 48  |
| 61557 | 114 | 248 | 6   | 64  | 62  | 38  |
| 61563 | 119 | 26  | 16  | 252 | 42  | 112 |
| 61569 | 248 | 8   | 8   | 8   | 126 | 254 |
| 61575 | 13  | 48  | 6   | 254 | 259 | 48  |
| 61581 | 31  | 12  | 35  | 24  | 243 | 35  |
| 61587 | 229 | 237 | 95  | 114 | 248 | 48  |
| 61593 | 112 | 240 | 237 | 176 | 42  | 114 |
| 61599 | 248 | 1   | 64  | 8   | 9   | 34  |
| 61605 | 114 | 248 | 235 | 34  | 112 | 240 |
| 61611 | 24  | 199 | 42  | 114 | 248 | 1   |
| 61617 | 48  | 117 | 183 | 237 | 66  | 229 |
| 61623 | 193 | 281 |     |     |     |     |

## NEWS

### SUNSTATE TIMEX SINCLAIR WINTERFEST '88

A lighter attendance than expected and heavy rain didn't dampen the spirits of those T/S users who gathered in Orlando, Florida on March 5 and 6 for the Sunstate T/S Winterfest. A good time was enjoyed by all those who could make it. The area is one of the nation's most popular tourist spots, with EPCOT and Walt Disney World just a short drive away.

The dealer tables drew the most interest, with companies such as Zebra Systems, Sharp's, At Computer Response, Foote Software, Syncware News, WDJUP Co., and Time Designs; displayed their merchandise.

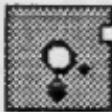
There were also some interesting Sinclair "one-of-a-kind" bargains to be found. For instance, At had boxes of items that were retrieved from the old Sinclair warehouse in Boston, when it shut down operations a few years ago. They offered packs of ZX81 ROMs, 2K RAMs, ZX80 kits which were in the original packaging, and the unique Sinclair FM Radio Watches...which were quickly snatched up.

Another interesting display was put on by Mr. Eric Johnson, of Orange City, Florida, who obtained a large stock of surplus Timex Sinclair items from a relative who works for Timex in Connecticut. Among the most notable were a series of TS1500 circuit boards that had been issued by Timex, from an early prototype board, to a later compact design from Portugal. There was also a good quantity of TS2068's for sale.

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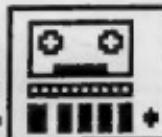
- ```

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<no more printer adjustments!
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That's right. Five Top-quality TDK cassettes tapes allow almost 30000 of 2068 program storage. And I'm selling them at less than \$1 each! Not seconds or blemish, these are brand-new TDK D60 cassettes. In all my years of using them I've never had one sent back because it was faulty.

(If ordering with other software these will be shipped free, otherwise please add \$2 per pak postage and handling)

(continued from page 7)

The Larken 256K RAMdisk for the TS2060 was unveiled for the first time in public. The small compact board features one-quarter Meg of non-volatile RAM, and when used with the Larken LEIOS cartridge, it operates with standard cassette-type LOAD and SAVE commands.

Along with the dealer tables, there were tables with catalogues and brochures from some absentee vendors, and a few user groups, including the Northeast Florida T/S Users Group (Jacksonville), the TABSAM group (St. Petersburg and Tampa), the CATE group (from Washington, DC), and the SHUG group (from Wisconsin, had tables as well).

On Saturday evening, a meeting was held to discuss the idea of a national Timex Sinclair user group. Some proposals were presented and comments were solicited from the audience. Overall, it was the consensus that such an organization would help unify and strengthen our TS community, and benefits such as a central Public Domain software library would be offered. (Check read the accompanying article on the national group for further details).

#### A National Sinclair Organization

S.N.U.G. (Sinclair Northamerica Users Group) is an idea spawned by the organizers of the Sunstate T/S Winterfest, and has evolved from suggestions and comments from other Timex/Sinclair users.

The intent of SHUG is to provide a forum for exchange of ideas. It would be a source of information, such as a listing of active members, active user groups, Sinclair-specific BBS's, an active library of Public Domain software, and a listing of available shareware and freeware. Later on, proposed industry standards for hardware and software would be adopted. So as to not have to "re-invent the wheel", an already established national group would be used as a model to base the group on (such as CORSA—the Corvallis Owners Assn.). SHUG would act as an umbrella organization, with regions being developed to tie in with established user groups in those areas.

It is not the intent of the SHUG organizers to infringe on, or supersede any already established group or company. It is only intended to show some strength to the industry that Sinclair is not dead, and the mere fact that an organization can be formed, will show unity and interest in Sinclair computers. Even a North American "Calendar of Events" could be established to help co-ordinate future plans and events.

SHUG needs the support of every single Sinclair user in the U.S., Canada, Mexico (or where-ever--anywhere). If you have any comments, questions, ideas, etc., contact either Mel Hathaway, 7515 Arbendale Drive, Port Richey, FL 34668, (813) 563-3552; or Mary-Lynn Johnson, 190 Hickory Woods Ct., Unit 3-C, Seltona, FL 32273, (305) 860-2445. The organizers of SHUG are putting a time limit of June 30, 1990 on their idea. If there is no response or support of the idea, then they will not proceed further. If there is input, an update will appear here in TSM.

#### SUMMER WESTCOAST TS FAIR FEATURES AN "ALL-STAR" CAST

The "perfect" summer vacation destination for any Sinclair fan is the emphasis for the Third Annual International Street Northwest TS Mini-Fair. What was once a regional affair held last year in Seattle, has expanded into a two-day event.

The show will be held on Saturday and Sunday, August 4 & 5, at the Cosmopolitan Hotel in Portland, Oregon. It is hosted by the CGAT/S User Group of Oregon, along with three other northwest Timex Sinclair groups, and is co-sponsored by RMD Enterprises and Time Designs Magazine.

Many of the exhibitors and guest speakers are already committed. To date, Zebra Systems (from New York), Sharp's Inc. (from Virginia), Ed Grey Enterprises (from California), American Micro Connection (from California), Jack Bohany (from California), RMD Enterprises (from Oregon) and Time Designs (from Oregon), are signed up to participate as dealers. Confirmed guest speakers include Jack Bohany (author of many software enhancements for the TS2060), Mike de Rose (author of "Taking The Quantum Leap"), Ed Grey (telecommunications expert), Byg Wyncop (TS2060 software developer and TSM columnist), Brian Codell, Michael Carver (programmer and TSM columnist), Vince Lyon (author of "Archive Master"), and Mark Lehtonen (BASIC programmer). Tentative at press time: Fred Nachbaur (Silicon Mountain Computers), Stan Laska (Pixel Print), Bob Orrfelt (EPROM enhancements for the TS2060), Wild Rider (Z8001 expert), and representatives from Cambridge Computer (Z8000).

User groups from California, Oregon, Washington, Nevada, British Columbia (Canada), and Wisconsin, are scheduled to participate.

On Saturday night (August 4) at 9:00PM, a Round Table Sinclair Forum will be held. This informal get-together will include a panel of noted Sinclair "experts", which will field questions from the audience. This will likely be the high point of the weekend.

One feature of the show will cater to the non-computer spouses and family members. For the kids, a professional clown will entertain, and for older folks (and the kids)...inexpensive guided bus tours will depart daily to explore attractions of the northwest (which include the Columbia River Gorge, Portland Zoo, Oregon Museum of Science and Industry, and views of Mount St. Helens).

Another feature of the show, will be to invite the general public to come experience "hands on" demonstrations of Sinclair computers. This is to combat the "fear" that some people still harbor towards personal computers.

Quality accommodations at the on-site hotel are very reasonably priced. Double occupancy for only \$38 plus tax. The hotel has a coffee shop on the ground floor, and a restaurant/lounge on the top floor--with views of the city lights at night and entertainment. The Cosmopolitan Hotel (1630 N.E. Union) is located just off of Interstate 5, and is close to bus lines, city transportation, and just short trip from the airport. Hotel phone number is (803) 235-8433, and mention the "Timex Sinclair Mini-Fair" to the reservationist.

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Start making your vacation plans to participate in this Timex Sinclair happening. For further information, contact the show producer, Rod Bowen, by writing to: 1419 1/2 7th Street, Oregon City, Oregon 97045; or call: 1503 655-7904. If you send a large self-addressed envelope with the 25 cent first class stamp, Rod will send you a complete packet of information including registrations forms, and brochures of area tourist attractions. A BBS is also online in the evening and morning hours (CET) for information. Phone number: (503) 655-8072. Modem setting: 8/1/None.

#### MIDWEST REGIONAL TS CONFERENCE

Another Sinclair gathering is planned for August 24 and 27, in Cleveland, Ohio, at the Beck Center for the Arts. The Greater Cleveland Sinclair Users Group is the host, and they are looking for other groups, guest speakers and vendors to participate. The theme of the event will be "users - learning from other users".

Inquiries about the regional conference can be directed to: Andy Koslarek, 2192 Mayfield Avenue, Lakewood, Ohio 44107; ComputerServe 10B 25046,3420. Or try the Timelines BBS: phone (216) 471-6922, setting: 8/1/None.

#### EVER HEAR OF THE T/S 3068? (AND OTHER MATTERS)

At a recent meeting of the LIST (Long Island Sinclair Times) users group, the former head of the Research and Development department of the Timex Computer Corporation, Billy Skyrme, attended and gave a talk. Mr. Skyrme is currently the president of PISON Inc., the manufacturer of the Organizer pocket computer.

While, Mr. Skyrme admitted that he still was under contractual agreement with Timex, and that certain information couldn't be discussed, he did mention some items that turned many members of LIST green.

The TS2048, stated Skyrme, was to have been either a "cleaned-up" 48K Spectrum, or a totally re-engineered design. While a clean Spectrum was submitted for FCC approval, the later model was selected for manufacture.

Another computer was in the works, called the T/S 3068. It would have featured 1 Megabyte RAM, Virtual Memory, 256 colors and high-res graphics. "The only machine...that would be in its class today is the Amiga," stated Skyrme. The T/S 3068 would have retailed for only \$199.95.

Another interesting fact, was that the "BEU" (Bus Expansion Unit) for the TS2048, as seen in the photo published by TIME SESSIONS issue July/August '86, page 22) was, according to Skyrme, completely engineered and ready for to be production. With internal floppy disk interface built in, Timex would have sold external 3.5" drives (in little silver boxes) for as little as \$49.95. This plan was far enough along that Timex had a supplier lined out for the drives.

Most of the information on proposed products for the TS2048 (and the TS3068) will never be made public due to a myriad of legal reasons, and the engineers involved in the project have all gone their separate ways.

Mr. Skyrme also demonstrated the Organizer and accessories to the LIST group. This hand held computer upgradeable to 256K RAM, has sold well in markets where recording and calculation of numbers in the field, and other simple "type-in" answers are required.

The LIST group can be contacted by writing c/o Harvey Raitt, 5 Pearl Lane, Valley Stream, NY 11581. The above information was supplied by member, Joe Newman.

#### TOM COLUMNIST MAKES "BIG TIME"

Duncan Teague, a regular contributor to TIME SESSIONS and other Sinclair publications, is now a regular contributor to COMPUTE! Magazine.

Duncan's connection to COMPUTE! began when a whole chapter on a book called "USING NEVROON" by Greg Kaiser (and published by the COMPUTE! Library Selection division of the magazine) was devoted to how a newsletter was published by Duncan and some students. Mr. Teague is the current director of the Craigmont Planetarium in Memphis, Tennessee, which is financed and operated by the Memphis City School District and is also a professional astronomer. The "in-house" publication is called "SKYLIGHTS", and is produced with NEWSROOM, a Macintosh computer, and a laser printer.

NEWSROOM is a desktop publishing program which is available for many different types of PC computers except the Sinclair...but then we have PIXEL PRINT!. It was one of the early entrants into this growing market, which has bred even more powerful programs.

Through the book, Duncan met the editor of COMPUTE!, and was asked to do software reviews of commercial Apple and Macintosh programs. His writings appear in the most current issues.

Rest assured, Duncan has not forsaken his Sinclair equipment, which he still uses at home (a TS2048 and Amico 16 disk drive system and other equipment). In fact, most recently, he has taken over the publishing and editing of his church's newsletter, and uses Lexmark's PIXEL PRINT desktop publisher for the task. (For an article on TS2048 Desktop Publishing by Duncan Teague see the Sept/Oct '87 issue of T/S. Watch for further information and tips from our resident desktop expert.

#### SOME OF THE BEST PROGRAMMING AROUND

If you really want your Timex Sinclair 2048 to work for you like it was originally intended to do, then you need to take a look at some of the very excellent programs written by Eric and Kris Bolavert of BYTE POWER.

To date, they have put together ten "issues" of their electronic magazine on cassette, which adds up to over 100 programs for the 2048! Byte Power Magazine is also Spectrum compatible.

In the most current issue, the cassette contains nine programs, plus documentation in a text file. "CONFLICT" has some of the best screens we've seen, perhaps only rivaled by a few commercial Spectrum programs. There are four other games plus a lotto number selection program, a utility and a boot utility for the new LX200 cartridge.

If you have never seen what this brilliant software team has cooked up for the TS2048, then you need to send for a sample issue of Byte Power for only \$2.50. Write to: 1748 Meadowview Ave., Pickering, Ontario, Canada L1V-3R6. Now there is no reason for anyone to complain about the lack of good T/S software...there's plenty of it available from Byte Power!

#### TWO NAMES CHANGE - SERVICE REMAINS THE SAME

ED GREY ENTERPRISES (formerly Grey & Clifford Computer Products) continues to support the Timex Sinclair market. A new BBS called the "Grey Matter BBS" is now online (1213-771-4200, settings: 8/1/None, supports 300/1200 baud). A FREE catalog of Timex-specific products and non-specific computer items is available by writing to PO Box 2186, Inglewood, CA 90303, or calling (213) 759-7406, and also requests can be accommodated on the BBS.

Assembled and tested versions of the popular Z-81/Z-82 RS232 Serial Card, are no longer available. However, a new BARE BOARD PACKAGE is now available for the TS2048 computer with complete documentation, for only \$24.50 + \$2.50 S/H. Write to Ed Grey for details.

Another TS dealer, Variety Sales, has changed their name to VARIETY COMPUTERS & ELECTRONICS. You can write for their free catalog at: 325 W. Jersey St., Suite 2-E, Elizabeth, NJ 07202.

#### FROM THE RUMOR MILL

Fred Nachbaur, of Silicon Mountain Computers, is reportedly developing a Timex Sinclair clone of his own, which will incorporate many improvements and enhancements. No further details are available at this time.

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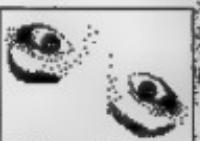
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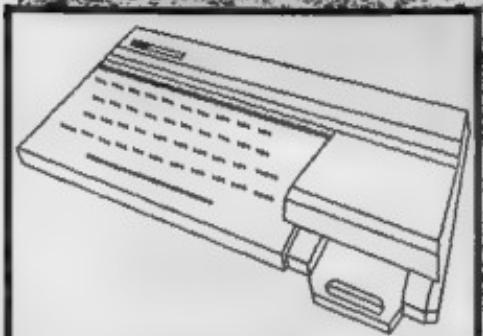


"House and Car" artwork by Arthur B. Margano, Philadelphia, PA, using TECH DRAW JR (Zebra).



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"Timex 2068" by William McBrine, of Salisbury, North Carolina, using his own art program called DBRAW S12.



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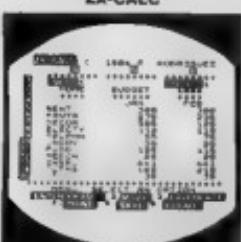
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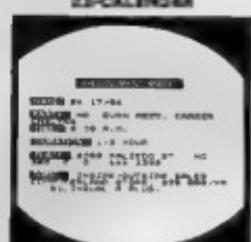
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## FRONT END

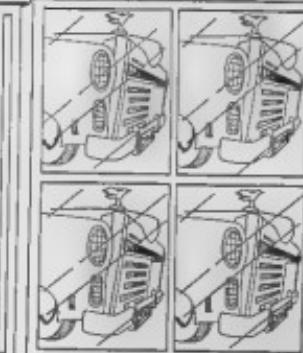
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### WINDOWS

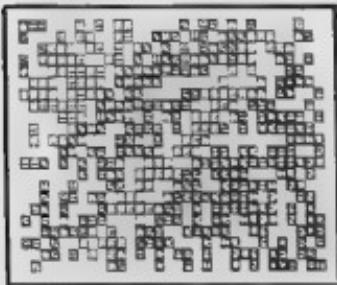
Let's start our discussion on 2068 windows by discovering that the 2068 treats the standard screen as three windows already! What? That's right, Uncle Clive's little wonder addresses the screen in the display file as three separate sections. I've mapped these in Figure 1 as A,B,C (the last two lines of C being the edit lines). Now if you're having trouble visualizing this, let's experiment for a moment. Type in a line like: 10 FOR t = 14284 TO 22527 : POKE t, 255 : NEXT t. Now RUN it and watch the display carefully. The program is directly poking the code for eight black pixels (255) into each consecutive address of the display file. Notice that it fills all of the window A before starting window B and so on. In the old Z80, the display file was much simpler. With the Z80 we will have to work around these set windows to produce our own custom sizes.

Fortunately the 2068 display file does have a system which a little code can work with to produce whatever we might want. Each byte holds the information of eight bits, each of which produces a pixel. If all of the bits are set (i.e., equal 1), like our code 255, then all the pixels are blacked in. Each screen byte along one row contains eight consecutive bytes in memory. Notice as we map that the first byte is address 14284 and as we progress along the 32 COLUMNS across the last in the row is 14315 (or 14284 plus 32). At the beginning of the next ROW (at address 14316) the next byte appears eight pixel elements below the previous ROW. This is because each screen character is eight pixels high as well as eight pixels wide. Looking at the exploded view of a screen character with our map you will see this. Each row of pixels in a character is stored at an address 256 bytes greater than the last.

Now to make sense of all of this type in Listing 1 entitled "screen address finder". The code in DATA lines 1600 to 1630 and disassembled in Figure A takes the two coordinates of a character location like we use in a PRINT AT statement and figures out the address of the top byte of that position in the display file. This is very important to us because we will need both information if we want to draw windows and also hope to restore any original stuff to the screen when we erase the window. Listing 1 randomly chooses some PRINT coordinates in the BASIC found in



| SCREEN | AKER | CH | TYPE | REPORT |
|--------|------|----|------|--------|
| 1      | 1    | 1  | 1    | 0.947  |
| 2      | 1    | 1  | 1    | 0.920  |
| 3      | 1    | 1  | 1    | 0.910  |
| 4      | 1    | 1  | 1    | 0.900  |
| 5      | 1    | 1  | 1    | 0.890  |
| 6      | 1    | 1  | 1    | 0.880  |
| 7      | 1    | 1  | 1    | 0.870  |
| 8      | 1    | 1  | 1    | 0.860  |
| 9      | 1    | 1  | 1    | 0.850  |
| 10     | 1    | 1  | 1    | 0.840  |
| 11     | 1    | 1  | 1    | 0.830  |
| 12     | 1    | 1  | 1    | 0.820  |
| 13     | 1    | 1  | 1    | 0.810  |
| 14     | 1    | 1  | 1    | 0.800  |
| 15     | 1    | 1  | 1    | 0.790  |
| 16     | 1    | 1  | 1    | 0.780  |
| 17     | 1    | 1  | 1    | 0.770  |
| 18     | 1    | 1  | 1    | 0.760  |
| 19     | 1    | 1  | 1    | 0.750  |
| 20     | 1    | 1  | 1    | 0.740  |
| 21     | 1    | 1  | 1    | 0.730  |
| 22     | 1    | 1  | 1    | 0.720  |
| 23     | 1    | 1  | 1    | 0.710  |
| 24     | 1    | 1  | 1    | 0.700  |
| 25     | 1    | 1  | 1    | 0.690  |
| 26     | 1    | 1  | 1    | 0.680  |
| 27     | 1    | 1  | 1    | 0.670  |
| 28     | 1    | 1  | 1    | 0.660  |
| 29     | 1    | 1  | 1    | 0.650  |
| 30     | 1    | 1  | 1    | 0.640  |
| 31     | 1    | 1  | 1    | 0.630  |
| 32     | 1    | 1  | 1    | 0.620  |
| 33     | 1    | 1  | 1    | 0.610  |
| 34     | 1    | 1  | 1    | 0.600  |
| 35     | 1    | 1  | 1    | 0.590  |
| 36     | 1    | 1  | 1    | 0.580  |
| 37     | 1    | 1  | 1    | 0.570  |
| 38     | 1    | 1  | 1    | 0.560  |
| 39     | 1    | 1  | 1    | 0.550  |
| 40     | 1    | 1  | 1    | 0.540  |
| 41     | 1    | 1  | 1    | 0.530  |
| 42     | 1    | 1  | 1    | 0.520  |
| 43     | 1    | 1  | 1    | 0.510  |
| 44     | 1    | 1  | 1    | 0.500  |
| 45     | 1    | 1  | 1    | 0.490  |
| 46     | 1    | 1  | 1    | 0.480  |
| 47     | 1    | 1  | 1    | 0.470  |
| 48     | 1    | 1  | 1    | 0.460  |
| 49     | 1    | 1  | 1    | 0.450  |
| 50     | 1    | 1  | 1    | 0.440  |
| 51     | 1    | 1  | 1    | 0.430  |
| 52     | 1    | 1  | 1    | 0.420  |
| 53     | 1    | 1  | 1    | 0.410  |
| 54     | 1    | 1  | 1    | 0.400  |
| 55     | 1    | 1  | 1    | 0.390  |
| 56     | 1    | 1  | 1    | 0.380  |
| 57     | 1    | 1  | 1    | 0.370  |
| 58     | 1    | 1  | 1    | 0.360  |
| 59     | 1    | 1  | 1    | 0.350  |
| 60     | 1    | 1  | 1    | 0.340  |
| 61     | 1    | 1  | 1    | 0.330  |
| 62     | 1    | 1  | 1    | 0.320  |
| 63     | 1    | 1  | 1    | 0.310  |
| 64     | 1    | 1  | 1    | 0.300  |
| 65     | 1    | 1  | 1    | 0.290  |
| 66     | 1    | 1  | 1    | 0.280  |
| 67     | 1    | 1  | 1    | 0.270  |
| 68     | 1    | 1  | 1    | 0.260  |
| 69     | 1    | 1  | 1    | 0.250  |
| 70     | 1    | 1  | 1    | 0.240  |
| 71     | 1    | 1  | 1    | 0.230  |
| 72     | 1    | 1  | 1    | 0.220  |
| 73     | 1    | 1  | 1    | 0.210  |
| 74     | 1    | 1  | 1    | 0.200  |
| 75     | 1    | 1  | 1    | 0.190  |
| 76     | 1    | 1  | 1    | 0.180  |
| 77     | 1    | 1  | 1    | 0.170  |
| 78     | 1    | 1  | 1    | 0.160  |
| 79     | 1    | 1  | 1    | 0.150  |
| 80     | 1    | 1  | 1    | 0.140  |
| 81     | 1    | 1  | 1    | 0.130  |
| 82     | 1    | 1  | 1    | 0.120  |
| 83     | 1    | 1  | 1    | 0.110  |
| 84     | 1    | 1  | 1    | 0.100  |
| 85     | 1    | 1  | 1    | 0.090  |
| 86     | 1    | 1  | 1    | 0.080  |
| 87     | 1    | 1  | 1    | 0.070  |
| 88     | 1    | 1  | 1    | 0.060  |
| 89     | 1    | 1  | 1    | 0.050  |
| 90     | 1    | 1  | 1    | 0.040  |
| 91     | 1    | 1  | 1    | 0.030  |
| 92     | 1    | 1  | 1    | 0.020  |
| 93     | 1    | 1  | 1    | 0.010  |
| 94     | 1    | 1  | 1    | 0.000  |
| 95     | 1    | 1  | 1    | 0.000  |
| 96     | 1    | 1  | 1    | 0.000  |
| 97     | 1    | 1  | 1    | 0.000  |
| 98     | 1    | 1  | 1    | 0.000  |
| 99     | 1    | 1  | 1    | 0.000  |
| 100    | 1    | 1  | 1    | 0.000  |



**Listing 1:** Display

lines 1710 through 1770 and then calls the code to get an address. Line 1740 pulls this info out of a little spare RAM address the code uses as a safe place to tuck such things. Line 1750 then "draws" a box around the periphery of this character square. By rewriting lines 1750 through 1770, one could exploit this facility in many ways.

Listing 2 is the real performer this time. It will use the code of DATA lines 1400 through 1450 to draw four portholes as shown. Again the BASIC lines 1510 through 1560 could be written to draw the gothic-style anywhere on the screen. If you study the ROM's CIRCLE and ERASE routines found at 9848 (32086 hi) and 9945 (2463 hi). By setting register A equal to the parameters we want and calling the ROM's integer stacking routine at 12510 (30086 hi) we circumvent the hassles of floating point.

n1 n2 n3 n4

---

**Listing 2: Display**

**Listing 2**

| perhole | depth | ex | type | resist. |
|---------|-------|----|------|---------|
| 1       | -37   |    |      | 3.050   |
| 2       | -38   |    |      | 3.050   |
| 3       | -39   |    |      | 3.050   |
| 4       | -40   |    |      | 3.050   |
| 5       | -41   |    |      | 3.050   |
| 6       | -42   |    |      | 3.050   |
| 7       | -43   |    |      | 3.050   |
| 8       | -44   |    |      | 3.050   |
| 9       | -45   |    |      | 3.050   |
| 10      | -46   |    |      | 3.050   |
| 11      | -47   |    |      | 3.050   |
| 12      | -48   |    |      | 3.050   |
| 13      | -49   |    |      | 3.050   |
| 14      | -50   |    |      | 3.050   |
| 15      | -51   |    |      | 3.050   |
| 16      | -52   |    |      | 3.050   |
| 17      | -53   |    |      | 3.050   |
| 18      | -54   |    |      | 3.050   |
| 19      | -55   |    |      | 3.050   |
| 20      | -56   |    |      | 3.050   |
| 21      | -57   |    |      | 3.050   |
| 22      | -58   |    |      | 3.050   |
| 23      | -59   |    |      | 3.050   |
| 24      | -60   |    |      | 3.050   |
| 25      | -61   |    |      | 3.050   |
| 26      | -62   |    |      | 3.050   |
| 27      | -63   |    |      | 3.050   |
| 28      | -64   |    |      | 3.050   |
| 29      | -65   |    |      | 3.050   |
| 30      | -66   |    |      | 3.050   |
| 31      | -67   |    |      | 3.050   |
| 32      | -68   |    |      | 3.050   |
| 33      | -69   |    |      | 3.050   |
| 34      | -70   |    |      | 3.050   |
| 35      | -71   |    |      | 3.050   |
| 36      | -72   |    |      | 3.050   |
| 37      | -73   |    |      | 3.050   |
| 38      | -74   |    |      | 3.050   |
| 39      | -75   |    |      | 3.050   |
| 40      | -76   |    |      | 3.050   |
| 41      | -77   |    |      | 3.050   |
| 42      | -78   |    |      | 3.050   |
| 43      | -79   |    |      | 3.050   |
| 44      | -80   |    |      | 3.050   |
| 45      | -81   |    |      | 3.050   |
| 46      | -82   |    |      | 3.050   |
| 47      | -83   |    |      | 3.050   |
| 48      | -84   |    |      | 3.050   |
| 49      | -85   |    |      | 3.050   |
| 50      | -86   |    |      | 3.050   |
| 51      | -87   |    |      | 3.050   |
| 52      | -88   |    |      | 3.050   |
| 53      | -89   |    |      | 3.050   |
| 54      | -90   |    |      | 3.050   |
| 55      | -91   |    |      | 3.050   |
| 56      | -92   |    |      | 3.050   |
| 57      | -93   |    |      | 3.050   |
| 58      | -94   |    |      | 3.050   |
| 59      | -95   |    |      | 3.050   |
| 60      | -96   |    |      | 3.050   |
| 61      | -97   |    |      | 3.050   |
| 62      | -98   |    |      | 3.050   |
| 63      | -99   |    |      | 3.050   |
| 64      | -100  |    |      | 3.050   |
| 65      | -101  |    |      | 3.050   |
| 66      | -102  |    |      | 3.050   |
| 67      | -103  |    |      | 3.050   |
| 68      | -104  |    |      | 3.050   |
| 69      | -105  |    |      | 3.050   |
| 70      | -106  |    |      | 3.050   |
| 71      | -107  |    |      | 3.050   |
| 72      | -108  |    |      | 3.050   |
| 73      | -109  |    |      | 3.050   |
| 74      | -110  |    |      | 3.050   |
| 75      | -111  |    |      | 3.050   |
| 76      | -112  |    |      | 3.050   |
| 77      | -113  |    |      | 3.050   |
| 78      | -114  |    |      | 3.050   |
| 79      | -115  |    |      | 3.050   |
| 80      | -116  |    |      | 3.050   |
| 81      | -117  |    |      | 3.050   |
| 82      | -118  |    |      | 3.050   |
| 83      | -119  |    |      | 3.050   |
| 84      | -120  |    |      | 3.050   |
| 85      | -121  |    |      | 3.050   |
| 86      | -122  |    |      | 3.050   |
| 87      | -123  |    |      | 3.050   |
| 88      | -124  |    |      | 3.050   |
| 89      | -125  |    |      | 3.050   |
| 90      | -126  |    |      | 3.050   |
| 91      | -127  |    |      | 3.050   |
| 92      | -128  |    |      | 3.050   |
| 93      | -129  |    |      | 3.050   |
| 94      | -130  |    |      | 3.050   |
| 95      | -131  |    |      | 3.050   |
| 96      | -132  |    |      | 3.050   |
| 97      | -133  |    |      | 3.050   |
| 98      | -134  |    |      | 3.050   |
| 99      | -135  |    |      | 3.050   |
| 100     | -136  |    |      | 3.050   |
| 101     | -137  |    |      | 3.050   |
| 102     | -138  |    |      | 3.050   |
| 103     | -139  |    |      | 3.050   |
| 104     | -140  |    |      | 3.050   |
| 105     | -141  |    |      | 3.050   |
| 106     | -142  |    |      | 3.050   |
| 107     | -143  |    |      | 3.050   |
| 108     | -144  |    |      | 3.050   |
| 109     | -145  |    |      | 3.050   |
| 110     | -146  |    |      | 3.050   |
| 111     | -147  |    |      | 3.050   |
| 112     | -148  |    |      | 3.050   |
| 113     | -149  |    |      | 3.050   |
| 114     | -150  |    |      | 3.050   |
| 115     | -151  |    |      | 3.050   |
| 116     | -152  |    |      | 3.050   |
| 117     | -153  |    |      | 3.050   |
| 118     | -154  |    |      | 3.050   |
| 119     | -155  |    |      | 3.050   |
| 120     | -156  |    |      | 3.050   |
| 121     | -157  |    |      | 3.050   |
| 122     | -158  |    |      | 3.050   |
| 123     | -159  |    |      | 3.050   |
| 124     | -160  |    |      | 3.050   |
| 125     | -161  |    |      | 3.050   |
| 126     | -162  |    |      | 3.050   |
| 127     | -163  |    |      | 3.050   |
| 128     | -164  |    |      | 3.050   |
| 129     | -165  |    |      | 3.050   |
| 130     | -166  |    |      | 3.050   |
| 131     | -167  |    |      | 3.050   |
| 132     | -168  |    |      | 3.050   |
| 133     | -169  |    |      | 3.050   |
| 134     | -170  |    |      | 3.050   |
| 135     | -171  |    |      | 3.050   |
| 136     | -172  |    |      | 3.050   |
| 137     | -173  |    |      | 3.050   |
| 138     | -174  |    |      | 3.050   |
| 139     | -175  |    |      | 3.050   |
| 140     | -176  |    |      | 3.050   |
| 141     | -177  |    |      | 3.050   |
| 142     | -178  |    |      | 3.050   |
| 143     | -179  |    |      | 3.050   |
| 144     | -180  |    |      | 3.050   |
| 145     | -181  |    |      | 3.050   |
| 146     | -182  |    |      | 3.050   |
| 147     | -183  |    |      | 3.050   |
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| 323     | -359  |    |      |         |

**Figure A**

Figure 8



TS2068  
DROP DOWN MENUS

Stan Lemke

One of the advantages the newer, bigger computers like the ATARI ST and AMIGA have over the T2020G class of computers is the "User Interface" that their bigger memory and high speed affords them...specifically, such things as a mouse to sweep a CURSOR around the screen, and a really nice menu structure that "drops down" onto the screen when your cursor touches the menu line, and then magically disappears when you make your selection. This allows your screen to be free of most of the menu until you need it. Even then, by planning your menu layout correctly, you can show just the items the user wants for a specific operation and be able to describe the selections more fully than with the usual short word (at most), or a single letter as is more often the case.

Well, with all these advantages to "drop-down" menus, I decided to see what I could do as far as creating a T82064 drop-down menu utility. The following program is just that, a general drop-down menu that will allow others to create every easily the type of menu they want on their expensive computers. It is also a neat little demo program that allows those who have not seen these menus in operation to get a feel of what they are like.

The utility displays 2 lines at the top of the screen, the first has a list of menu (header) topics, the second displays the program title/name. Using the LEFT joystick, the user moves a small arrow CGO pixels around on the screen. When the arrow cursor is placed on any of the menu headers, a set of menu listing programs onto the screen below that menu header. As the cursor is moved over the options, each turns THICKER VISION, and when the FIRE button is pressed the cursor moves off that option. Pressing the fire button activates the selection. Moving the cursor off of the menu options (and pressing FIRE) removes the menu list, and replaces the original screen.

The menu headers and options are defined in DATA statements, in lines 9005 thru 9025. In the demo, when the DEMO option is selected, a Copyright message about the program is displayed (see line 74401). This Copyright message can be user-defined...up to 3 lines and 23 characters per line. 3 more menu headers can be placed on the top line. Note: You must be careful designing these headers. As the program places two spaces before each header, these may be a "null string" (empty, two apostrophies placed side-by-side) indicating NO, etc., happenin.

#### **Listing A**

總行總部：新嘉坡，新嘉坡中央郵政局旁邊，新嘉坡中央郵政局旁邊。

78-2058 D-142000 Rev.  
© by S.C.I. 1988  
LEVEL SOFTWARE DEVELOPMENT  
2144 University Dr.  
Seattle, WA 98103

0000 REM INT A= B  
1000 SET MEM1,ITEM 0000,0000  
2000 SET MEM1,ITEM 0000,0000

LINES 9000 - 9000 INSTANTLY

```
0000 DIM S$1811 DIM S$19 DIM T
 4 DIM S$12 DIM S$13 DIM S$14
0001 PAPER ? INK @ BORDER 1
CLS
0002 REM
0003 DATA LIST 1, LIST 2 -15
0004
```

Menu Selection are defined using DATA statements in lines 9015, 9020, and 9025. Six selections are available for each header, with the option of using null (empty) strings as above, to indicate no more selections.

Let's take a look at the program listing. The program is set up ready to be compiled with TIMACHINE from Novellsoft. The program will work just as it is in BASIC tape. Program execution begins at line 9000. Lines 9000 to 9099 are program initialization.

Listing A is a copy of the BASIC program in *csm* form. The TIMACHINE compiler directives are already set up so you can compile the *csm*. Although the program will work in BASIC, it is 8-L-04!

Following the program listing is the CR-TYPE output for debugging the program Listing B..see the May/June '87 issue of TDM!. Listing C is the

**TIMEACHINE** output. Listing 9 is an excerpt from a sample menu that shows how to set up a 2 header menu. Other Program Notes: Line 9066 contains the bytes for the arrow cursor UD0. Lines 9290 to 9360 perform the cursor movement. Line 9355 contains a PAUSE 4 to control cursor speed.

I hope you enjoy playing with this demo, and maybe someday we'll see some TSB2048 programs using real disk drives soon.

MEMO 002491 DRAFT 0000-00-124E3

| BRN   | BRH   | BRW   | BRM   | BRT   | BRD   | BRG   | BRP   | BRU   | BRV   | BRX   | BRZ   |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 91000 | 90901 | 90802 | 90703 | 90604 | 90505 | 90406 | 90307 | 90208 | 90109 | 90010 | 90000 |
| 10000 | 10101 | 10202 | 10303 | 10404 | 10505 | 10606 | 10707 | 10808 | 10909 | 10010 | 10000 |
| 20000 | 20101 | 20202 | 20303 | 20404 | 20505 | 20606 | 20707 | 20808 | 20909 | 20010 | 20000 |
| 30000 | 30101 | 30202 | 30303 | 30404 | 30505 | 30606 | 30707 | 30808 | 30909 | 30010 | 30000 |
| 40000 | 40101 | 40202 | 40303 | 40404 | 40505 | 40606 | 40707 | 40808 | 40909 | 40010 | 40000 |
| 50000 | 50101 | 50202 | 50303 | 50404 | 50505 | 50606 | 50707 | 50808 | 50909 | 50010 | 50000 |
| 60000 | 60101 | 60202 | 60303 | 60404 | 60505 | 60606 | 60707 | 60808 | 60909 | 60010 | 60000 |
| 70000 | 70101 | 70202 | 70303 | 70404 | 70505 | 70606 | 70707 | 70808 | 70909 | 70010 | 70000 |
| 80000 | 80101 | 80202 | 80303 | 80404 | 80505 | 80606 | 80707 | 80808 | 80909 | 80010 | 80000 |
| 90000 | 90101 | 90202 | 90303 | 90404 | 90505 | 90606 | 90707 | 90808 | 90909 | 90010 | 90000 |

ABOUT THIS PROGRAM, THE

1981-82 BOSTON BRUINS  
1982-83 BOSTON BRUINS



# REVIEW THE TS2068 AND THE COMMODORE 1520 PLOTTER

reviewed by Frank Davis

Something I have really missed, not being able to do with my TS2068 is using it with a plotter. This was most unfortunate as I had used one on an earlier system I owned...a VIC20 by Commodore. I had used a 1520 Color Plotter Printer. It was at the point of working out the problem of interfacing the rather unusual serial port on the Commodore 1520, when I picked up a magazine and found an ad for an interface program software to run the plotter on the Times Sinclair VIC20. I went for some information and very shortly had the kit in my hands to begin the task. NOTE: Get the list you know what you are doing and are not rusty at the soldering iron...otherwise order the completed interface.

The Commodore 1520 uses paper slightly wider than that used by the TS2060 printer, but not the standard 8" as it is under 5". However, it is regular paper and is available from Commodore, Radio Shack and many Atari dealers. They also carry the four colored pens used in the plotter. All of these brands made a similar plotter, and each set up to interface with their particular computer. The colors are black, blue, red and green. In all the years I have had this plotter, I have had but one problem with it...a small plastic gear running loose and not being able to turn the other gears to move the paper back and forth. A small amount of super glue gel seems to have cured this. If you ever have to do this be careful not to get it in the grooves of the gear itself.

The graphics you can do with this interface and the available software don't seem to be no means limited. John McMichael, the designer of the interface and the programmer does not make any features. The driver program that comes with the interface contains an extensive demo of just what can be expected of this combo. You can also assume the demo program, but not copy it to the 2040 printer or LIST it. You can also clear out the BASIC (except Line 10 which you will need to load the machine code) and use this driver for your own programs. This is a better deal than I got from Commodore when I purchased the plotter originally, it had no ready to run program with it, no driver, only a manual with a few short sample

programs of which all but two of them contained errors in the programs.

Other software available for this interface include the following: A) SCREEN TO PLOTTER, which allows you to use the plotter like a monitor to draw dots, by use of the cursor or a joystick; save text, save screens or load to previous; saves screens and edit them, all in four colors. When using text you have many choices, such as solid lines or dashed lines, size of print, character rotation, centering. To change colors in pictures or text is as simple as hitting the letter "C" or changing pages by use of the letter "P". This is a user friendly program.

B. CHG 1520, is a program which allows you to combine customized HSCRIPT V5 or V5.2 and the 1520. This allows the use of the 1520 as an 80 column printer in color and the use of all of the 1520 functions in text file.

C. PIC PLOT, which allows you to do a dump of a screen to the 1520 in two sizes. You can select one color for the small plot and two colors for the larger plot. It also allows you to put colored captions or sub-titles below the pictures.

D. BANNERPIC, a program that allows you to use the 1520 to make colored banners. You may plot up to two hundred characters using the special UDD's that come with the program, or use those of the ROM set. It has 58 selectable character sizes and each character can be whatever color you assign it. The banner may have the characters designed either as vertical or horizontal, and the characters may be inverted or done as an over character. You can select proportional spacing or not. The only thing missing here was the option to fill in the character or not to fill. It should be easy to use your own UDD's with this program.

The 1520 is an ORPHAN in its own right. It is no longer available from Commodore in the U.S. I have seen some ads for it in some British Magazines along with the VIC20, still being offered for sale. This means that you first need to get one before you invest in this nifty interface and software. They are available at many TDS-R-US stores across the nation for \$30 to \$40 (not bad when I think of the \$199 many people paid). You might just check a local Commodore User group to see if someone wants to let go of one. Also check your local Commodore Dealer to see if he still can get you one. I saw used ones for sale at each of the computer and hobby shows I went to this last year. They were also being offered for \$49.95 + \$3 S/H by ALL ELECTRONICS CORP., PO Box 20400, Los Angeles, CA 90064, 1-800-826-5432.

To get more information about this interface and the software, write to John McMichael, 1710 Palmer Drive, Laramie, WY 82070.



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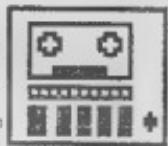
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# Z-COLUMN

The "Z-COLUMN" is a new and regular (hopefully!) feature of *ZINE DESIGN*. We will cover news and helpful tidbits of information for the Z88 Laptop Computer...the newest addition to the Sinclair family tree. On occasion, we may also accompany this column with an article or product review.

What better way to kick off a new column than to make a major announcement? Yes, that's right...just as Cambridge Computer (Sir Clive's new company) promised...the Z88 has passed the FCC test, and is now available here in the U.S.

While some details here sketchy at press time, we do know that Cambridge Computer has signed a deal with a U.S. distributor, and that the new computers are being assembled by SCI in Huntsville, Alabama, with foreign parts. SCI is a U.S. based corporation that has worldwide concerns, and is in fact manufactured in the European Z88 for Cambridge, in a Scotland factory.

The U.S. Z88 is reported to have an updated ROM. It also has a steeper retail price than what most of us anticipated...\$649.90. No getting around this, the weak dollar has driven prices up. (In fact all personal computers are going up in price for the first time in years. And Japanese RAM chips are once again expensive.) Some folks will certainly shy away from the price, but this is the most powerful (for its size and weight) laptop computer currently on the market.

1/2 Meg RAM cartridges are now available for right around \$400. With three of them installed, it gives the user 1 1/2 Meg to play with "on the go". The 1 meg. cartridges are still supposed to be released in a couple of months.

Lots of third-party support taking off now in Europe. Here are a few of the most recent developments:

J-Term is a new telecommunications package in U.S. version is available that supports XMODEM, Baudot, and can drive virtually any modem, including the new miniature Z88 modems from Miracle Systems.

Cumexek will have their disk drive interface (with RGB monitor output) available soon for \$199. It works similar to the Radio Shack floppy drive system for the Model 100.

Forum Magazines (the publishers of *Z88 WORLD Magazine*, will launch their new Z88 specific magazine this month.

The Z88 Users' Club of Great Britain has formed, and already has four club newsletters published, called the *Z88 EPROM*. For further information, write to Roy Woodward, 48 Wellington Street, Long Eaton, Nottingham, England NG10-4NB. (Thanks to Larry Chauvin of Canada for supplying this information.)

While I attended the *COMPUTER FAIR* in Orlando, Florida, I had the privilege of meeting Stan Velti, who is Vice Publisher/Owner/Editor-in-Chief of *COMPUTER SHOPPER*. While Mr. Velti had attended the Fall Comdex in Las Vegas, a representative from Cambridge gave him a Z88 for review (see the March '88 issue of *Computer Shopper*). Stan uses the Z88 as his "electronic notebook" wherever he goes. Now here is someone who has access to virtually any PC or laptop...and actually prefers the Z88 for some applications over the others. He mentioned that the "silent keyboard" is a big plus in conferences.

Well, no doubt, many of you are skeptical about this new computer, and the price alone will drive a big share of the "hardcore" Sinclair types away. But nevertheless, this is an excellent laptop computer,

and the finest computer for Sir Clive to date. It's not another Sinclair "monocoggle" (as one newsletter editor called it)...yet admitted he had never used one before). While at the Florida Winterfest, the same comment was heard time and time again at the SHARP'S booth: "This is what the QL should have been!" It's not knocking the QL though, as it does have merits of its own.)

Sir Clive himself is very serious about this computer, and wants to insure its success. Bryan Davies, a columnist for *Z88 WORLD*, recently told me on the phone, that the last *ZICOMFEST* (a trade show open to the public) he attended, found Sir Clive up on the stands demonstrating the little "Z" to attendees.

That's about it for this issue. Hope to be back next issue with more stuff. Until then, you can send a S.A.E. to me in care of *ZINE DESIGN*, and I'll send you more info on a user group starting up here in North America. If you have already sent your envelope...I will finally have responded to your request by the time you read this--promise!.

- Tim Woods

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# TS-2068 UP-DATE the user's NEWS

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48-2985 SP-DATE is a quarterly publication designed to  
the needs of users of the TR-2985 Book of Standard  
Tables. The 1968 edition was discontinued in October 1968.  
Replaced Edition is available, part number 147-004-04 with the pre-  
fix of L-1000.

## T/S 1000/ZX81 **OP-AMP DESIGN**

Mike McGlinchey

This program is a CAD (Computer-Aided Design) program to assist the user in designing 741 type internally compensated operational amplifiers. It will run on a Z80/151/T8000 or T8150.

After keying in and running the program, you must supply the following six parameters:

1. Type: Inverting, non-inverting or differential
  2. Frequency
  3. Voltage Gain
  4. Input Voltage(s)
  5. Supply voltages ( $V_{CC} = V_{EE}$ )
  6. Biasing resistors

The computer will then calculate and list the following:  
Voltage  
Bandwidth  
Output Impedance  
Feedback Resistance  
Phase Angle  
Input Impedance

After the listing is complete, you can view the schematic diagram. This program is capable of handling the three basic op-amp configurations (i.e., inverting, non-inverting, and differential mode). Since this program is based on the popular 741 type op-amp, the following nominal values are given:

Dain Bandwidth Product=0.8Pm1,000,000  
RI=Input Resistance=1,000,000 $\Omega$   
Ro=Output Resistance=75 $\Omega$

Also, the -3dB Bandwidth is not really  $-3dB$ , but is the ideal  $GB$ . Above the bandwidth the rate of closure is  $-20dB$  per decade. If the op-amp's output voltage is calculated to be greater than the supply voltages, then  $VOUT = VCC - VEE$  and a "clip" will appear on the list.



## MICKEY-MOUSE GRAPHICS

by Fred Nachbaur, DJ.H.M.I.T. \*

I'll start this article with a little T/S soap-boxing. Perhaps I should add the disclaimer that these are my views, not necessarily those of this magazine (or anyone else, for that matter).

Recent times have seen a lot of attention to video digitizing; converting an image from a video signal or from hardcopy, into an image in computer RAM, which can then be displayed on the CRT screen. This results in realistic images ONLY if you happen to have a color Mac or an Amiga, with their ultra-high resolution, huge color palette, and correspondingly humongous RAM.

However, when using the Timexes and Sinclairs (even the 2048 and 6L), this has always struck me as a case of the tail wagging the dog. Even the best images that result are grainy, with unrealistic colors. In short, "Mickey-Mouse."

The situation gets even worse when converting such images back to hardcopy. When using a printer, even the finest software gives only rather primitive grey-scales. Color plotters might seem to be an improvement at first glance, but with their palette of (typically) four colors, the pictures that result are usually little more than interesting curiosities.

What has always fascinated me about the computer is its capability to GENERATE graphic images. What does a computer do best? Compute! i.e., crunch numbers, slavishly running complex mathematical formulas and displaying the results in graphical form. From this viewpoint, the only difference between the ZX81 and the Cray II is speed of execution. (Well, ok. There may be one or two other, albeit minor, differences.) To paraphrase an ancient phlosopher, "Dive unto VCR's that which is video, and to computers that which computes."

It is entirely thanks to the computer that a whole new geometry has emerged: the "fractal" geometry discovered and pioneered by Benoit Mandelbrot and friends, and explored by countless amateur computerists. Fractals are not the only "interface" between mathematics and art; the side-panels accompanying this article, showing how a mouse hatches from an egg, was done with Fourier analysis, a mathematical procedure two centuries old. Want more? How about wire-frame graphics of geometric shapes, "wallpaper" algorithms, "Navajo rugs," spirograms, and on and on.

Very well, now that your computer has taken some nifty algorithm and transformed it into a breath-taking display, how do you save it for posterity? Sure, you can save screens and recall them later, but what if you want faithful hardcopy? As mentioned earlier, ordinary printers work fine with monochrome images and line-drawings. Inexpensive color printers or plotters do a little better, since they can print in red, green and blue in addition to black. Such images still fall far short of the color capability of the GL, TS2048, or TS3000 with Oliger II video. Darn. Guess we'll just have to go out and buy a \$2000 color laser printer. WRONG!!

### Super-CHEAP Super-Graphics

Timexers have become renowned for finding simple solutions to hairy problems. Is there an inexpensive way of getting faithful hardcopy of even the most complex color screens? Going further, is there any way of getting color hardcopy from a completely stock TS1000 with its black-and-white TV? The answer to both questions is YES. Would you believe that the first is possible with hardware you probably already own, no additional software, at a cost for supplies under 50 cents per copy? Or that breath-taking color from a ZX81 takes just a little more software savvy, patience, and experience?

The solution lies in something that might seem pretty "Mickey-Mouse" at first, but is really very elegant and simple. We're going to take a look at an "ancient" technology, going way back to a certain Mr. Daguerre. That's right; ordinary, everyday photography. Many people are under the delusion that taking a picture of a CRT screen is impossible, or at best, very difficult. In actual fact, it's barely more involved than taking a snapshot of your fishing buddy proudly displaying his prize minnow.

\* Dabbler in Many Weird, Interesting Technologies

## THE POLAROID APPROACH

I have seen acceptable snapshots done with some of the newer Polaroid or Kodak "instant cameras." These have the advantage of providing hardcopy within seconds of taking the snap. However, there are a few problems associated with these that make them less than ideal, assuming that you don't need the "instant" feature.

One problem has to do with parallax. At the close range that is required, these and other "viewfinder" cameras will displace the image because of the distance between the viewfinder and the "taking" lens. Another problem is that the user seldom has full control over exposure time and lens aperture. Further insight into this may come when you read the following section. Lastly, your acquired picture is the only one of its kind. There is no cheap way of making dupes and enlargements, or correcting minor exposure or framing errors.

## THE VERSATILE SLR

I've found the SLR (single-lens reflex) 35 mm. camera to be the best tool for taking photos of computer-generated images. Even a cheap, used, off-brand model will be fine for the task at hand. Since focusing and framing is done via the same lens as is used for taking the actual picture, there is never a parallax problem. Furthermore, you generally have full control over exposure time (shutter speed) and aperture, the two main variables determining your final picture.

A tripod is very helpful, almost essential. You CAN do without it, by bracing your camera atop a stack of books or other props, but a decent tripod makes it SO much easier and less frustrating.

## SHUTTER SPEED

The reason that a tripod is needed, is because acceptable pictures are only produced at slow shutter speeds. Consider that a TV or monitor screen is basically a serial device, scanning a complete picture in 1/60th of a second. If shutter speed is less than 1/40, then only a portion of the screen will actually expose the film. Also, actual shutter speed at 1/60th will rarely be EXACTLY the same as the vertical interval of your computer, nor will it be in "sync". The result can be narrow bands of darkness (not exposed), or brightness (partially double-exposed). Since most SLR's have a "focal-plane" shutter, they will also tend to introduce diagonal bars or "tears" in your picture if the timing isn't perfect. Shooting at 1/30th reduces both effects, and shooting at 1/15 virtually eliminates them. However, to be completely safe, you might consider shooting at 1/8 sec. This corresponds to an exposure of 15 frames; one partial exposure out of 15 full ones will never be noticed.

## APERTURE

The other control that varies the amount of light that reaches the film is the lens aperture setting. There are basically two ways of setting this; by using a light-meter, and by trial and error. If you use a light meter, fill your screen with a representative image, to get a reasonable starting point.

**WARNING TO ADVANCED SHUTTER-BUGS:** Even though your CRT is actually emitting light, DON'T use an incident light meter. Use your good old reflected light meter. The reason is that the CRT behaves photographically AS THOUGH it were reflecting light from an external source.

If you use the trial-and-error approach, shoot a test roll at various apertures, at both 1/8 and 1/15 second shutter speeds. Fill the screen with a representative image, containing approximately equal areas of all colors. When the roll comes back, look at the NEGATIVES to find the one(s) that have the best exposure. Hint: use a B&W film of the same speed as your proposed color film, and "develop only" to keep costs down.

Whether you use your light meter, or the trial-and-error approach, don't go whole-hog on your first session. Have your first run of pictures developed first. You can thereby inspect the negatives to make any necessary corrections. One reason is that some films exhibit "reciprocity effect" at long exposure times, making light meter readings less accurate. Another is that the garden-variety "averaging" meter may not give a true reading with the photographically "unusual" subject matter.

Adjust your contrast and brightness as well as the color controls to give the clearest picture possible. A lower "brightness" than usual will generally give sharper photos. At the other end, extremely dim screens will typically have a bright "edge" or "flare" at the juncture of different colors. If you have a video peaking control, adjust it to give a sharp image without flares. Make the optimum settings with a Jiffy-marker, to make your setup easy to duplicate next time. Unless you're experimenting with special effects (as below), be wary of changing your monitor settings during a photo session.

I found that when using my 12" Sakata color monitor with the GL, and shooting on 200 ASA Fuji film, my optimum setting was f/11 at 1/15 sec., and f/16 at 1/8 second. The pictures shot at 1/15 were indistinguishable from 1/8 second, using an older-model Canon SLR.

If you have several monitors, use your best one for your photo sessions. Look at color saturation, sharpness, and geometry (are rectangles truly rectangular? Are circles circular?).

#### LIGHTS OUT!

This is important. If you ignore this, you'll be sorry when you get your prints back. When taking your picture, the room should be completely darkened. The ONLY light source should be your monitor. The reason is that any light in the room will cause reflections from the front glass of the monitor. "Anti-reflective" coatings on glass will NOT eliminate this effect! You may not even notice it while taking the pictures; the eye (brain) is remarkably adept at tuning out such "noise." The camera, however, is adamantly unforgiving.

Other advantages to "lights out" are that blacks will truly be black, and that the frame of the monitor will usually not show. If it does, consider painting it black for covering with black camera tape before further experiments.

This next admonition may sound silly to advanced shutter-bugs, but you'd be surprised at how many people will make this error: using an electronic flash. Pictures taken with a flash will only be pictures of a blank white screen. Remember, the video display is a light SOURCE. It does NOT operate by reflecting incident light. Using a flash will completely wash it out.

#### FRAMING

As mentioned earlier, using an SLR will allow you to exactly frame your picture. Take the time to frame your screen properly. Not only should the TV screen be centered in your viewfinder, but it should also be free of distortion because of an improper viewing angle. Pay close attention to the top and bottom; if the top is wider than the bottom you'll have to physically lower the camera, and vice versa. Same goes for left-right alignment. Stand back from your setup as another check: the plane of the TV screen should be exactly perpendicular to the camera lens' line of sight. (How do you see why I recommend using a tripod?)

Finally, don't fill the entire viewfinder frame. Most cameras (the inexpensive ones, anyway) don't have an exact correlation between the borders of the viewscreen, and the actual edge of the film image. Furthermore, in process of printing, a little bit of the image is always lost around the edges. Keep the TV screen image in an area about 90% of the full viewscreen, and you should be alright.

## Advanced Topics

If you're a more advanced photographic enthusiast (perhaps even a professional), there is really no limit to the magic you can do with your computer and camera. I'll touch on some ideas for you to experiment with.

#### MULTIPLE EXPOSURES

If your camera allows double or multiple exposures, and if you have at least some software expertise, you can have yourself a field day.

How about unaligned colors? One way to do this is by using your TINT control to give colors not "normal" for your machine (e.g. browns, flesh tones, violet, etc.). The reason I mention software expertise is that you'll have to figure out some way of "filtering" all but the desired colors, leaving the rest black. Make an exposure of these, then reprint the screen with your "alternate" colors, adjusting TINT to give the desired effect. Make the second exposure. Continue as far as practical, or you have patience for.

At the beginning of this article I promised a way of displaying full-color images from a stock ZXBI, using an ordinary white-screen TV set. Again, multiple exposures can be used to display as many colors as you like. This time, however, you'll need a set of optical filters of the desired colors, as well as the ability to do "software filters" to display only the material of each color, for each exposure. Ordinary colored cellophane actually works surprisingly well. If you're in a larger city that has a motion-picture supply house, try to get a booklet (usually free) of "sample" lighting filters, as supplied by Lee and other companies.

When using optical filters, you'll also have to know the "f-stop factor" for each color filter used. If not given, you can get an approximation by using your light meter: point the camera at a blank white wall, and note the f-stop reading. Put the filter in front of the lens, and determine by how many stops the light has been decreased by the filter. This will typically be between 1/2 and 2 f-stops. Use this data to compensate your aperture opening during exposure.

Let's say you want to do a color picture of a particularly neat fractal. Plot only those points corresponding to each color, then shoot it with the appropriate filter. Continue to your heart's content. In principle, especially if you are doing the picture in MONO mode, you can come up with pictures that look as if they were done on a Mac.

When doing multiple exposures, a GOOD tripod is absolutely essential. So is a bulb or cable release. The SLIGHTEST movement will throw your picture out of registration, and thus betray your "secret."

Another factor that affects registration is electronic in nature. Especially at high brightness, the distribution of light and dark on a CRT can affect the width (and sometimes even the height) of the displayed image. This is called "blooming." Reduce blooming to a minimum by using the lowest brightness that will give an acceptable picture.

Many cameras, especially the more modern ones, are extensively interlocked against accidental multiple exposures. Fine for the ordinary snap-shooter, but a real bane for advanced amateurs and beyond. Some cameras can be "tricked" into multiple exposures by holding the rewind release button while advancing the film. I say "some," because while many will allow this, there may not

keep perfect registration. The only way to find out if your camera holds the film securely enough during this operation, is to experiment.

This next suggestion might cost the toenails of pros and semi-pro's, but don't write it off as "just one of ol' Fred's ravings." Remember the Argus C-3? These were made by the millions in the '50's, and are still giving camera reviewers flashback nightmares. However, it is 1984, for playing around with computer photography. Why? Let me count the ways. It can be picked up CHEAP at any photographic junk shop. It uses readily available 35mm film. It has a between the lens leaf shutter, causing much less trouble with video images than do focal-plane shutters. It is almost too easy to double expose. Its blocky shape is a bonus if you don't have a tripod, and rely on a stack of bricks to keep your act together. Focusing is easy with its split-image rangefinder. The only thing you'll really have to worry about, is parallel. However, this won't take you long to compensate, with a little experimentation.

#### SELECTIVE DEFOCUSING

Getting back to our friend, the SR, there is another trick you can use to actually IMPROVE the image you see on the TV, especially with color monitors. Since these have discrete dots making up the plane of the display, the photons that result can have an obviously grainy "Video" look.

Most CLR's automatically open the aperture all the way during set-up and focusing, both to allow for maximum brightness and to narrow the depth-of-field to make focusing easier. However, all but the cheapest ones have a way to override this, so you can view your scene at the actual aperture selected. You can use this feature to slightly defocus your image, causing the discrete phosphor dots on the CRT to blend together.

You'll have to use judgement, and the wisdom of experience, to determine how much defocusing is ideal. Not enough, and you still have the grain. Too much, and you lose resolution, making the picture look like a mask out of focus. Done right, however, it will be difficult to tell that the resulting photos were shot from a TV or monitor screen.



A PARTING SHOT....

I'll leave you with a little anecdote. Shortly after the ZX81 came out, I worked up my first "big" program. The TS2040 was not yet available, and I refused to buy that awful "ZX" printer. Guess how I generated program test mats, and screen dumps for my documentation? That's right, I used my trusty rusty SLR to shoot each screen, then had the film contact printed. Early purchasers of my original TOWER package (the predecessor to the program that did the side-panel shown here) may still be wondering to this day, how I got those clean, sharp minus screen-dumps back in those bad old days. Well now you know.

The circle is complete. From a stop-gap measure because suitable printers didn't exist, to high res color fractals, good old conventional photography still has little competition if you want striking color hardcopy of your graphic computer displays. Especially if you consider the cost!

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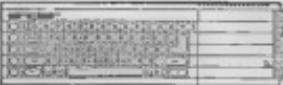
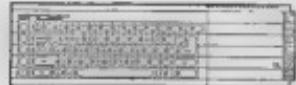
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# PLAYING WITH ELECTRICITY

Harvey Taylor



Tucked away in a description of the GL hardware in the Technical Guide is mention of the fact that bit 7 of the Single Channel Register can be used to switch the base of screen memory from \$200000 to \$208000. Some interesting thought and went on to more pressing concerns.

Recently, I went back to investigate the dual screen display. There is a discussion & program dealing with it in Adrian Dickens' "An Advanced User Guide". The news is it is real, but flawed. First a quick overview of the GL memory map:

|      | HEX        | USES                              |
|------|------------|-----------------------------------|
| 250K | \$00400000 | Top of On Board RAM               |
| 192K | \$00300000 | Top of Screen                     |
|      |            | Top of Common Heap                |
|      |            | Base of Common Heap               |
|      |            | Top of Sys.Var                    |
| 180K | \$00200000 | System Variables & Base of Screen |
|      | \$00200000 | Top of Screen                     |
|      | \$00200000 | Base of Screen                    |

The immediate problem with the second Screen is the fact that the System Variables are locked into \$200000 which is the base of Screen0. This means that if you simply flick the bit which controls the base of the display, you will get a bunch of garbage at the top of your screen. The garbage is the video representation of the System Variables.

You can take a look at this effect with the following short SuperBasic Procedure:

```
100 REMark switch on Screen 2
101
102 DEFINE PROCEDURE SWITCH
103   HV MCSTA=163832 REMark $200000
104   DCI_RBL =994003 REMark $100000
105   DCB_STATUS=PRBX(MCSTA)
106   SCR_STATUS=DCB_STATUS // 128: REMark toggle bit 7
107   PDRM HV MCSTA,DCB_STATUS : REMark tell Sys.Var
108   PDRM DC $200,DCB_Status : REMark tell hardware
109 END DEFINE SWITCH
110
```

This is interesting, but useless. To make a useable display, one has to be a little trickier. One of the neat things about the GL is that GDOS is extensible. In particular, one can link in tasks for the GL to perform after each interrupt. There is a Level 2 Interrupt (called a Frame Interruption) on the GL every 1/60 second, which is related to the Vertical Sync signal.

What we need to do is Link in a short Task which checks what screen we are displaying, then if we are displaying Screen0, do nothing, while if we are displaying Screen1, wait until the display has passed the 5K or so of System Variables then switch to Screen0.

Unfortunately, the interrupt code to do this is listed below in the file Dualmon.asm. Once you have got this code installed, you will run into the next problem. There is no support in GDOS for writing to Screen1. It is evident that in the development of the GL, this was a matter of some debate, because in the SCR/COM Channel Definition Block (CD.BIN), there is an entry (\$U\_SCH) base address of screen. The unfortunate fact is that the SCR/COM device driver does not use this variable. Instead the base address (\$200000) is hardcoded into the driver. This was no doubt done in concert with the decision to use the 200K base of \$200000.

As the GL is at present, if the driver did use the CD.BIN variable, clearing the screen would erase all the System Variables, so it is just as well that it is not implemented!

What's to do? I resorted to me that the simplest method to use would be to simply copy Screen0 into the useable part of Screen1. The SuperBasic extension SCOPY performs this task, but it is not a general copier as well, so I added the PROCEDURE COPYL. This procedure expects one parameter which is used to colour Screen1. The video ram of the GL display is arranged thus:

| Mode 4   | Odd Byte | Odd Byte | - Bits    |
|----------|----------|----------|-----------|
| 76543210 | 98765432 | 98765432 | G - Green |
| 00000000 | 88484848 | 88484848 | B - Red   |
|          |          |          | F - Flash |
|          |          |          | B - Blue  |

Putting \$0F in the parameter G, will paint the screen black. You can play with other parameters to see the effect of setting various bits. If you use \$52283 for Green, the interpreter returns an overflow error; but -256 works fine. \$255 paints the screen red.

The procedure SCR1 turns off the Auto-Toggle and gives you the default display, ie. Screen0. The procedure SCR2 turns off the Auto-Toggle and gives you Screen1. The procedure SCR3 turns on the Auto-Toggle, ie. switch between the two screens using CTRL-F5.

This function SCREEN tells you which screen is currently being displayed, #0 or 1. The function \$D68E will tell you the base of the Common Heap Memory reserved by the initialisation code.

There are some proviso's with this code. It should be initialised from a boot. In particular before a directory of a second device is done. This is because we want Screen0 to begin as close to the base of the Common Heap as possible. If you do a directory of another device before initialising, \$2005 reserves some common heap as a Channel Definition Block and a Physical Definition Block. This will show up as a white band similar to what SWITCH produces.

Related to this situation is the value of the VSyncout value used to wait before switching Screen0 on. See the comments in the save file.

The other proviso, is that the dividing line where Screen1 switches in is not stable. The easiest way to handle this problem, is to put a black border over the region similar to the PROCEDURE BDMM below.

The first Basic program below creates a file 25CR\_ext which is used by the second the SBasic program BDMM

```
100 REMark PLAY WITH SCREEN UTIL
101
102 LAYOUT
103 INIT
104 DEMO
105 STOP
106
107 DEFINE PROCEDURE BDMM
108   PAPER 0: CLS
109   PICTURE
110   PAPER 4
218   AT 0,0: PRINT 'SCREEN 1'
229   SCR0
230   SCR1
231   CLS
232   SCR0
233   SCR1
278   LIST TO 268
268   AT 0,0: PRINT 'SCREEN 0'
299   PRINT#0, '$UE <CTRL-F5> TO TOGGLE SCREENS'
300 END DEFINE BDMM
310 '
320 DEFINE PROCEDURE PICTURE
330   FOR M=0 TO PI STEP .25: FOR N=
TO 180 STEP 15 : INK (END(2,8)): CIRCLE 28
9,120,N,.5,M: END FOR N END FOR M
340   INK 7
350 END Define PICTURE
355
376 DEFINE PROCEDURE INIT
396 name='25CR_ext'
398 dev#=1:f1'
400 LDYTES dev#&name,BEEP(B512)
410 PRINT#1'Loaded'
```

```

438 CALL RESPR($)
439 PRINT"Initialised"
440 END DEFINE INIT
450 :
458 DEFINE PROCEDURE LAYOUT
459  WINDDOME8,512,64,0,0 : BORDER $0,10,0
460  WINDDOME1,512,192,0,0 : BORDER $1,10,0
461  WINDDOME2,512,192,0,0 : BORDER $2,10,0
462  PAPER8,2,4 INME#2,8
463  PAPER16,4 INME#1,7
464  PAPER32,2 INME#0,7
465  SCALE 256,0,0 MODE 4
466 END DEFINE LAYOUT
558
108 REMark Create SCR2 EXT file
112
120 DLOAD
130 DRAVE
140 STUP
150 :
160 DEFINE PROCEDURE DLAVE
170 REMark Save memory to file
171 name$="SCR2_ext"
172 dev$="fpl"
206 BYTES dev$ & name$,HEPR($),400
210 END DEFINE DLAVE
228
238 DEFINE PROCEDURE DLOAD
248 REMark writes DATA to memory & initia PLOC & PUNC
250 addy$=HEPR($,512)
260 RESTORE 400
270 REPEAT loop
275 HEAD #1 IF #1=1: EXIT loop
276 POKK adder,x
277 adder$=addr+1
218 END REPEAT loop
228 PRINT#0,"Loaded"
336 CALL RESPR(0)
348 PRINT#0,"Initialised"
350 END DEFINE DLOAD
280 :
370 REMark SCR2_ext code for 2 screens utility
371 REMark SCLR,SCOPY,SCR0,SCR1,SCBA,SCBNM,SCBOK
372 REMark
400 DATA 67,258,0,70,52,128,1,16
410 DATA 78,148,116,0,34,88,0,3
420 DATA 0,0,65,240,0,2,128,0
430 DATA 32,48,0,8,65,248,0,8
440 DATA 146,136,47,1,112,24,78,65
450 DATA 34,31,74,128,102,24,67,78,65
455 DATA 1,16,34,136,67,258,1,24
470 DATA 65,258,1,12,112,25,30,73
475 DATA 8,4,78,88,112,8,78,117
480 DATA 0,3,0,144,4,63,67,82
500 DATA 65,0,0,144,4,63,67,82
510 DATA 48,0,0,144,4,63,67,82
520 DATA 49,0,0,65,5,63,67,79
530 DATA 68,69,0,34,4,63,67,78
540 DATA 62,0,0,0,0,0,0,174
545 DATA 6,65,67,82,78,85,77,8
550 DATA 0,116,0,33,82,77,82,82
570 DATA 69,0,0,0,52,138,1,18
580 DATA 78,148,74,128,102,8,12,67
585 DATA 0,1,102,24,78,112,241,78,117
600 DATA 48,54,182,65,258,0,154
610 DATA 32,0,0,77,240,0,0,0,0
620 DATA 48,128,177,2,112,181,258,98,8
630 DATA 0,132,0,7,248,0,8,0,0
640 DATA 0,255,96,72,67,258,0,74
650 DATA 0,44,138,0,3,64,69,249,0,2
660 DATA 128,0,19,4,0,51,280,235,252
670 DATA 96,55,27,258,0,184,89,280
680 DATA 98,98,67,258,0,98,65,83
690 DATA 0,62,87,258,0,88,50,108
700 DATA 0,255,96,72,67,258,0,74
710 DATA 34,17,34,118,0,88,93,73
720 DATA 45,73,0,88,61,128,152,0
730 DATA 74,129,182,16,52,0,6,8,32
740 DATA 83,68,227,129,184,258,228,145
750 DATA 81,128,182,0,45,129,152,2
760 DATA 128,2,98,24,114,1,194,58
770 DATA 0,20,34,118,0,88,85,73
780 DATA 45,73,0,88,61,128,152,0
790 DATA 56,68,0,3,112,0,78,117
800 DATA 0,0,0,0,0,0,0,0
810 DATA 0,0,0,0,0,0,18,46
820 DATA 0,52,10,193,0,1,128,99
830 DATA 74,43,0,7,103,36,74,174
840 DATA 0,152,182,58,74,174,0,154
850 DATA 102,44,74,46,0,230,182,38
860 DATA 48,68,6,44,0,1,280,255,254
870 DATA 0,109,8,7,193,0,1
880 DATA 128,99,74,43,0,6,183,14
890 DATA 74,46,0,51,183,0,61,230
900 DATA 0,51,70,43,0,7,78,117,1
910

```



# MANDELBROT -- A Fractal World

## Part Three

Michael E. Carver

### The Machine Code

Now that we have the BASICS out of the way, we can get down to the microcode or the machine code portion of our program. It is not my intention to provide an introductory lesson in 60000 assembly language programming with this article. However, I do intend to cover GL specific instructions (i.e., Traps and Vectors). There are a number of books available to teach the basic instruction set of the 60000 family of chips. One series of books is available from Motorola for a very reasonable charge.

Before I get started with our discussion of the various supporting machine code programs, a short disclaimer. This program was my first attempt at coding in 60K code. Experienced programmers will find some awkward and round-about approaches in the code.

#### MANDELBROT SOURCE CODE

##### start

One of the important things to remember, when writing machine code for the GL, is that the Register \$0 must contain the value of 0 for a successful return to BASIC. The GL uses this register to provide

for error traps and reports when returning from Trap or Vector calls. Any value, other than 0 in \$0, is seen by the ROM as an error when returning to BASIC, or concluding a Trap/Vector call. See pages 19-20 of the Concepts section of the GL User's Guide for a breakdown of the Error Report Codes. \$0 will contain a negative value for an official error (i.e., -1 = not completed, -2 = invalid job#, etc.). The first routine in our source code, starf, simply locates and stores the location of the array data area to be used by the machine code program.

##### calc

Our next section is one of the round-about methods I warned you about. Its role is to retrieve, from BASIC, certain floating point values needed for the iterative calculations. The straight-forward approach would be to obtain these values from within the machine code program, using an input from keyboard routine. Even so, some valuable lessons can

be learned from this section of code. In the GL, the SuperBASIC memory area is dynamic. It can grow or shrink and move about within memory. For this reason, the A6 register is used to point to the base address of this area. Any particular location in this area, including SuperBASIC system variables or the BASIC program, is referenced relative to A6. Each area of this memory is indexed by the pointers, from the start and the end. These "stacks" are upside down. The SuperBASIC system variables start at offset \$000. Note: I will be using "H" to indicate numbers in HEX. Each procedure, function, and variable created from within SuperBASIC is indexed via a name table and a name list. Their starting addresses are found in the SuperBASIC system variables area. Their offsets are \$010 (\$V.NTBS) and \$020 (\$V.NLBS) respectively--both long words. Their ending addresses are found at offsets \$01C (\$V.NTP) and \$024 (\$V.NLP).

The Name Table is composed of blocks of eight bytes. This block contains information on the type, a pointer to the location in Name List, and a pointer to the value. See Table 1 for a complete breakdown of this information.

Let's now look at the calc routine of the code. The comments accompanying the first few lines of this routine are misleading. The result of `adovl`, `sizeAdr`, or `sizeAdr` does not retrieve the actual address, only the offset from A6. By adding A6 to A1, the actual ending address of the table is found. Since the SuperBASIC variables we wish to pass to machine code programs are floating point, we are looking in the Name Table for the occurrence of '\$0200' (see Table 1). The actual names are stored in the Name List with one byte for the length of the name, followed by the ASCII of the name. Checks are made through the Name Table for floating point variables. If one is found, its entry in the Name List is calculated and a check for either C1 or C2 is carried out. By declaring the machine code variable space as a long word of 0 and by transferring the data from the Name List into the first 3 bytes of space, we can make a long word check against B1 and B2 (see section labeled *floating*). The Name List is not arranged in a normal \$0000 manner. It is customary, in dSK assembly language, to insure that all addresses be on word boundaries (i.e., even addresses). When found, the addresses of the actual floating point values are stored in their appropriate machine code spots.

Floating point variables are stored in the GL with six bytes: a 16-bit exponent with a 32-bit mantissa. Integers are stored as two's-complemented words. The GL stores strings with the first word defining the length of the string, followed by the actual string itself. If the string is an odd number of bytes long, it will be stored with space bytes to adhere to the normal dSK convention of word boundary addresses. Array storage is rather complex. There is one long word as a relative pointer to the actual start of data. This is followed by a word for the number of dimensions. For each dimension, a pair of words is used which define the dimension along with an index multiplier for it. This preamble is followed by the actual array, using the same format as stated above for integer, floating point, or string.

#### set\_up

The first portion of this section moves the actual floating point data from the SuperBASIC variable area into our machine code variable area. We are now ready for our first voyage into the GL ROM via Vector utilities--floating point math.

Before any calculations are carried out, a check for ample space on the maths stack should be performed. This is accomplished by the Vector utility \$1A (\$V.CHKIX - reserve space on maths stack). Upon entry, B1 should contain the number of bytes needed less a long word. When exited, the following registers are effected:

|              |              |
|--------------|--------------|
| B1 corrupted | A6 preserved |
| B2 corrupted | A1 preserved |
| B3 corrupted | A2 preserved |
|              | A3 preserved |

If there is insufficient space on the stack, this Vector call will expand it. This may entail moving the stack's location. The location of the stack is found by checking the SuperBASIC variable \$V.RIP, which has the offset from A6 of \$050.

#### bigloop

Floating point routines, within the GL ROM, are accessed by two different Vectors, RI.EXEC - \$11C for one operation and RI.EXECB - \$11E for a list of operations. Upon entry, the following registers should be set up as follows:

|      |                                                   |
|------|---------------------------------------------------|
| B0,W | operation code (RI.EXEC only)                     |
| D7,L | set to 0 to insure reliable execution             |
| A1,L | pointer to maths stack (relative to A6)           |
| A2,L | pointer to the list of operations (RI.EXECB only) |
| A3,L | pointer to base of variable area (relative to A6) |

The following registers are affected by the call:

|    |           |    |                                |
|----|-----------|----|--------------------------------|
| B1 | preserved | A6 | preserved                      |
| B2 | preserved | A1 | updated pointer to maths stack |
| B3 | preserved | A2 | preserved                      |
|    |           | A3 | preserved                      |
|    |           | A4 | preserved                      |

An error report -19 in D0 will indicate an arithmetic overflow.

See Table 2 for the various math functions available. All results of the math operations will be found on the top of the stack. RI.ZUP (duplicate) is the only exception, in that it will increase the stack by one item and update the stack pointer leaving two items on the stack. The first four resolve the first item on the stack and replace it with the result. The next four (along with RI.PCMPP) take both items on the stack and replace them with one item and thus decrease the size of the stack. The remaining functions will remove the top item on the stack and replace it with the result. To use the RI.EXECB (list of operations), A3 should point to the list of bytes (opcodes). This list must end with \$00.

All of the math operations carried out by this portion of the code have only the items on the stack, though R000 was reserved for 4 floating point numbers. This allows us to leave certain items on the stack and by changing the stack pointer, carry out another operation. Finally, this new result can be combined with other items left on the stack for further math operations. This saves the need of pulling items off the stack, storing and retrieving them when needed later. Scan the code between *bigloop* and *check* and see if you can trace this manipulation of the maths stack. (Refer to the first article in this series to see a BASIC version of the calculations being carried out by this portion of the code.)

The remainder of the Hazelnet Source Code should be fairly self explanatory.

#### SNAPSHOT SOURCE CODE

**IMPORTANT NOTE:** There is a major error in both the source code and the BASIC loader (Listing 4, TBM Nov/Dec '87) for the Snapshot machine code routine. A "typo" reversed the numbers in the source code. In the source code, lines labeled *snapshot* and *paste* should read 130066 not 130166. In the BASIC Listing 4, lines 1000 and 10201 '\$8282,1,-4,12890' should read \$8282,2,14,12890. My apologies to all who could not buy this careless error.

This is a straight-forward piece of code. It reads a group of bytes form a certain section of the screen's memory map and stores them in a variable area contained in the machine code program. My approach to accomplish this was rather amateurish, but quick and dirty. To find the actual starting point for the upper-left-hand corner of the mini-window area, I POKED numbers into the screen's memory until I found the exact point. The screen's memory starts at \$20000 or \$130122D and is a total of 32K long. The actual screen grid is 128 bytes wide and 256 bytes high. The mini-window is 24 bytes wide and 32 bytes high. The window starts 14 bytes from the start of the screen and is 24 bytes wide. By adding 80 to the last address of the window's scan line, we will be exactly 1 line below the start of the previous location (or a total of 120 bytes). The paste routine reverses this process by moving the copy of the mini-window area back to the screen.

## PLOTTER SOURCE CODE

### start

This machine code module contains two separate routines. One, start, plots the mandelbrot map from already compiled data. The other one, plot, draws the map while it is being calculated. The first section of code (start, m\_loop and n\_loop) run through the already calculated data, setting the proper ink color and plotting each point to the screen. Let's examine the various subroutines used by both routines.

### convert

This subroutine is a machine operation executed by calling the RILENEC Vector previously discussed. Before we can plot a point to the screen, the x and y coordinates must be in floating point forms.

### ink

The color attributes for any window can be set by calling one of three Trap #3 routines. They are:

DP\_SETPA --- #000027 --- paper color  
SP\_SETST --- #000028 --- strip color  
SG\_SETCI --- #000029 --- ink color

Upon entry, the following registers need to be set accordingly:

D1.B color  
D2.W timeout (-1)  
#B.L channel ID

Upon returning, the following registers are affected:

D1 preserved A8 preserved  
D2 preserved A1 corrupted  
D3 preserved A2 preserved

ERRNO. -1 not complete or -2 invalid channel ID

Channel ID's in machine code are not quite the same as Channel #'s in SuperBASIC. The Channel Table contains pointers to channel definition blocks within the common heap. For #FF000000 if the channel is closed. The channel ID consists of two words. The low word is a reference to its location in the Channel Table and the high word is the tag number. Every time a channel is opened, its tag number will be one greater than the previously opened channel. When the GL is fired up, 3 default channels are open. #00000000 is SuperBASIC channel #0 (the lower window), #00010001 is SuperBASIC channel #1 (the print window), #00020002 is SuperBASIC channel #2 (the list window). No matter what the SuperBASIC channel # is for the next channel opened (i.e., #32), it will almost certainly have the channel ID of #00030003. The Mandelbrot program uses the default window #2 to display the mandelbrot map, making calculations of the channel # a snap.

This section of code uses the color data POKED into memory by the SuperBASIC program (lines 2930 and 4250). The distance point from the mandelbrot set (i.e. 255) is used as an index pointer to the appropriate color in this table.

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Pennell, Andrew *The Sinclair 68000 companion: a guide to the 65 operating system*. Sunshine, 1985.

Williams, Steve *Programming the 68000*. Sybex, 1985.

### plot

Graphic routines from within machine code are also accessed through Trap #3 functions:

#D.POINT --- #000030 --- plot a point  
#S.LINE --- #000031 --- draw a line  
#D.ARC --- #000032 --- draw an arc  
#D.ELLIPSE --- #000033 --- draw a circle or ellipse  
#D.CURR --- #000034 --- define scale and origin

Upon entry, the following registers must be prepared:

D2.W timeout (-1)  
A2.L channel ID  
A2.L maths stack pointer

Upon exit, the following registers are affected:

D1 corrupted A8 preserved

D2 preserved A1 corrupted

Each of the functions require that certain parameters (floating point form) be placed on a maths stack pointed to by A1. This stack is also upside down. To insure successful operations of the functions, there should be 240 bytes free on the stack. See Table 3 for the parameters which must be on the stack (relative to A1) for each of the graphic routines.

### start2

Unlike the routine at start, this routine only plots one point at a time, updating the machine code variables for the x and y coordinates before returning to BASIC. It also uses the same subroutines detailed above.

Some of the variables used by this code may have been POKED into their location from SuperBASIC (array, m\_point, n\_point and color). This is another round-about method of passing parameters from SuperBASIC to machine code.

I hope this article will be a start for the aspiring 68000 machine codists. There is a great potential lurking in the heart and soul of the GL, and most of it is easily accessible via machine code. I feel that 68K machine code is much more flexible and dynamic than Z80. (Hm, hm, if any of you Z80 fans have gotten this far, don't count me as an ex-Z80 buff. He will still find me hacking away at the ole Silver Avenger--T82068!) With the availability of a large number of Traps and Vectors, much of the chore of coding in assembly language has been removed. Once again, I would like to apologize to any who may have lost a few nights sleep due to the error in the Snapshot code.

Due to the length of the source code listing of Michael Carver's Mandelbrot machine code subroutine, this listing will be included next issue, when this series concludes.

- editor

TABLE 1 -- Variable types

**WORD** defines the type of the name  
**WORD1** undefined string variable  
**WORD2** undefined floating point number  
**WORD3** undefined integer  
**WORD4** string expression  
**WORD5** floating point expression  
**WORD6** integer expression  
**WORD7** string variable  
**WORD8** floating point number  
**WORD9** integer  
**WORD10** substring (used internally only)  
**WORD11** string array  
**WORD12** floating point array  
**WORD13** integer array  
**WORD14** SuperBASIC procedure  
**WORD15** SuperBASIC string function  
**WORD16** SuperBASIC floating point function  
**WORD17** SuperBASIC integer function  
**WORD18** MReP loop name  
**WORD19** FOR loop counter (starting point)  
**WORD20** machine code procedure  
**WORD21** machine code function  
  
**WORD** pointer to entry in name list (or -1 if expression)  
**long** pointer to value (for variables this is an offset into the variable area, or if undefined, a negative number). For SuperBASIC procedures and functions, the high word is the line number of the DEP statement. For machine code functions and definitions, the long word is the absolute address of the routine.

TABLE 2 -- Floating Point functions

| PCODE | NAME       | FUNCTION                                  |
|-------|------------|-------------------------------------------|
| 602   | R1.MINT    | INT floating point into WORD integer      |
| 603   | R1.INT     | truncate floating point into WORD integer |
| 604   | R1.MINTINT | INT floating point form into long integer |
| 605   | R1.LINTINT | Convert integer into floating point       |
| 606   | R1.ADD     | add TOS to NDS                            |
| 607   | R1.SUB     | subtract TOS from NDS                     |
| 608   | R1.MULT    | multiply TOS by NDS                       |
| 610   | R1.DIV     | divide TOS into NDS                       |
| 612   | R1.ABS     | take absolute value                       |
| 614   | R1.NEG     | negate                                    |
| 616   | R1.DUP     | duplicate                                 |

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| CODE | NAME     | FUNCTION       |
|------|----------|----------------|
| 618  | R1.COS   | cosine         |
| 619  | R1.SIN   | sine           |
| 620  | R1.TAN   | tangent        |
| 621  | R1.COT   | cotangent      |
| 622  | R1.ACOS  | arccosine      |
| 623  | R1.ACOSR | arccosine      |
| 624  | R1.ATAN  | arctangent     |
| 625  | R1.ACOT  | arccotangent   |
| 626  | R1.SQRT  | square root    |
| 627  | R1.LLN   | natural loge   |
| 628  | R1.LOG10 | base 10 loge   |
| 629  | R1.EXP   | exponential    |
| 630  | R1.POWPP | take NDS ^ TOS |

TABLE 3 -- Graphic function parameters

| GD.POINT | NAME                          | FUNCTION |
|----------|-------------------------------|----------|
| 606(A1)  | y co-ord                      |          |
| 606(A1)  | x co-ord                      |          |
| 607(A1)  | y co-ord of end of line       |          |
| 607(A1)  | x co-ord of end of line       |          |
| 608(A1)  | y co-ord of start of line     |          |
| 608(A1)  | x co-ord of start of line     |          |
| 609(A1)  | angle of the arc              |          |
| 609(A1)  | y co-ord of end of arc        |          |
| 609(A1)  | x co-ord of end of arc        |          |
| 610(A1)  | y co-ord of start of arc      |          |
| 610(A1)  | x co-ord of start of arc      |          |
| 605(A1)  | angle of rotation             |          |
| 605(A1)  | radius                        |          |
| 605(A1)  | eccentricity if a circle      |          |
| 611(A1)  | y co-ord of center            |          |
| 611(A1)  | x co-ord of center            |          |
| 603(A1)  | x position of graphics origin |          |
| 603(A1)  | y position of graphics origin |          |
| 604(A1)  | scale factor                  |          |
| 604(A1)  | graphics x co-ord             |          |
| 604(A1)  | graphics y co-ord             |          |
| 605(A1)  | horiz. pixel offset of cursor |          |
| 605(A1)  | vert. pixel offset of cursor  |          |

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# Time Designs Tests

## TAX-I-QL/87, PACIOLI and THE SPY

by Mike de Sosa

Sounds like a spy thriller, but the title really refers to an income tax preparation program (in the nick of time), a personal or small-business double-entry accounting system, and a revolutionary multi-taskable, multi-file, universal full-screen editor—all for the Sinclair QL.

**EMSOFT'S TAX-I-QL/87 \* \* \* \* 1/2**

**TAX-I-QL/87** is a rather complex IRS Form 1040 template designed to simplify tax preparation by individuals or tax-form preparers. It replaces **TAX-I-QL** which had to be rewritten from scratch. It is used with either **QLINK** version 2.1 or **ABACUS** version 2.3 and a QL with at least 256K RAM. Few instructions are on the template, and most instructions must be read from IRS forms, but this should remove a little drudgery from the process, satisfy your soul, and leave you a good record with which to impress your IRS tax auditor.

The disk version can print to IRS forms but the Microdrive version will not.

Since you probably won't read this before 30 March, I have tried to arrange an expeditious way to order the software. **TAX-I-QL/87** is deductible at \$24.95. Send your check to **EMSOFT**, P.O. Box 8763, Boston, MA 02114-8763. Specify the Microdrive or 5 1/4" disk version, and, if the latter, whether double- or quad-density. **EMSOFT** will expedite shipment. No telephone orders.

**A.R.K. Distributions THE SPY \* \* \* \* \***

**A.R.K.'s THE SPY** is from Richard Howe and those wonderful folks who gave us **ARCHIVIST**. **THE SPY** is billed as a multi-file, multi-taskable, universal full-screen editor. Not a word processor, the program "is designed primarily for programmers who want an editor which EXECs quickly, multi tasks, and takes as little space as possible in RAM while providing all the fundamental editing facilities at the highest speed."

**THE SPY** lives up to this billing and more. A.R.K., for Applied Research Kernel, Distribution is in the business of designing and retailing business software, and their latest product is another good piece of work. 500K of assembler source language have been compiled onto about 300 Microdrive sectors. The people at A.R.K. believe that in the future most small computer systems will be emulated faster on Transputer-based home micros, and, if so, computer owners may be freed from the whims and follies of computer companies.

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**THE SPY** is said to be compatible with **QLINK**, **KEYDEFINE**, and probably with other master multitasking programs. (The software arrived too late to test its operation with other such programs and its price was not mentioned, but Mark at **SHARP**'s should have the "straight skinny" on price and compatibility by the time you read this.)

\* **Transputer.** A firmware/hardware addition for microcomputers that will vastly increase their speed of operation and versatility so that computers like the QL might become virtually obsolescence proof. Leon Heller, editor of **QUANTA**, has been working on this revolutionary development for some time.

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# Why the QL?

## Now is not the time to give up on the Sinclair QL!

by Mike de Sosa

A number of people have said that the Sinclair QL is dead—that there is no point in upgrading to the QL or in sticking with it any longer! These nay-sayers cannot be more wrong. Following are just some of the reasons why you should upgrade to the QL or stick with it:

1. The Sinclair QL package is, quite literally, the best value for money of any professional computer.
2. Other Sinclair computers "would not die," and the QL is no exception—it is still "state of the art."
3. Second- and third-generation QL software—for more affordable and in many cases better than most big name brands—is now available.
4. Many QL users who use big-name brand minicomputers and personal computers at work, such prefer the QL for many reasons.
5. Low-cost and innovative QL firmware and hardware which fully utilizes the QL's great power is only just now approaching fully developed status.
6. The QL Users and Tinkerers Association (QUANTUM) library now provides 20 quad-density floppy disks containing QL software and documentation of all types and descriptions at very low cost to members—contact Tom Bent between 7pm and 10 pm EST at (301) 739-7187 for further information on QUANTUM, its excellent monthly newsletter, its massive members' software library.
7. The T/S 2668 is an excellent computer which has given us great service, but it lacks the necessary capacity to run comprehensive database, spreadsheet, desktop publishing, and integrated (multitasked) programs. The QL with TRUMP CARD uses 89% of RAM!
8. Most QL users are unaware of or do not make full use of the latest QL products which can transform operation of the QL to such an extent that it should be the computer of choice for many at a small fraction of the cost of many less capable systems!

To take fuller advantage of your QL, subscribe to TIME DESIGNS Magazine (\$16.95 a year for six big issues) and purchase Dr. Mike de Sosa's excellent book, *TAKING THE QUANTUM LEAP*, the most up-to-date book on QL, written in language anyone can understand, which explains many useful things about the QL just not found in its user guide. Both are available from TIME DESIGNS, 29722 Hilt Rd., Colton, Oregon; tel. (503) 824-2658; CompuServe ID 71358,3238. Order both now!

Buy a QL or two or three of them from your favorite QL dealer while they last!

Prepared using PAGE DESIGNER 2—Looks like the Macintosh!

# Why the QL?

Now is not the time  
to give up on the Sinclair QL!

by Mike de Sosa

About four years ago I wrote an article for *Reader's Digest* (never published) about the new Sinclair QL microcomputer. I entitled the article "The First Lightweight, Low-cost Supermicrocomputer" and promised that the QL would soon revolutionize the computer world, including the training of computer users, financing, and logistics. And the QL promised to do just that, but a few things went wrong: early models of the QL and early versions of its bundled software were just not ready for release, resulting in some bad reviews; Sir Clive's marketing strategy left many things to be desired; the U.S. distributor, though personally helpful to me, was poorly organized and refused to advertise—the statement was made, "We don't need the U.S. market"; the Reagan administration held up FCC clearance for seven months crucial at the time; computer sales went flat; Sir Clive almost went broke because of his electric tricycle and had to liquidate his QL brainchild; etc.

The Sinclair QL and its bundled software, is now "fully developed" through the efforts of Peicon Ltd. and third-party firmware designers, notably Tocu Tabby, and its price has dropped from \$500 to under \$100.

The QL remains the first lightweight, low-cost, supermicrocomputer. Many computer experts—regular users of Apple, IBM, Texas Instrument, and other PCs—have visited me and marveled at what an intelligently augmented QL can do. (They even like the keyboard and Microdrives—unique to Sinclair—which many have previously knocked.) When I tell them what the computer and its allied software, firmware, and hardware cost, their jaws really drop! For many of the same reasons that the QL was to have revolutionized the computer world in 1984, it remains an extremely versatile, almost obsolescence-proof computer (remember the term *transputer*—a new device which will, among many other things, permit the emulation (and input/output to) any type of computer, permitting the true universalization of computers—it's coming soon for the QL.)

What I'm trying to say is that the QL is an excellent machine that, when properly upgraded, will allow you to join the computer revolution and remain "state of the

art" for the foreseeable future—and this at the very lowest cost!

Many other reasons for sticking with or upgrading to the QL are listed on the facing page, and I could go on listing them all day, mainly in connection with the many outstanding classic and new software programs now available. Did you hear that Peicon Ltd.'s QL CHESS, running on the QL, won the World Microcomputer Chess Championship for the third time?

## LOW-COST JS ROM NOW AVAILABLE

One problem with U.S. QL's is that they are furnished with JSU ROM chips rather than JS ROM chips. The former cause certain graphic distortions/relocations with some software, for example GRAPHIQL+, VRROM!, PROJECT PLANNER, DECISION MAKER, etc., thus limiting their use. Replacement JS ROM chips are now available for about \$25, and for about \$35 you can have the JS ROM plus built-in TOOLKIT II, or ICE, or QFlash RAMDISK & TOOLKIT (no, you must furnish these chips) on SPCOM. For another \$10, RNC Enterprises, tel. (503) 765-2455, will even install it in your QL or a new QL, but I understand that this is a snap, requiring less than ten minutes work and no soldering. Have it put in a new QL, and buy yourself a spare QL—with JS ROM—today, the price may never be lower. Check with your favorite QL distributor for exact prices, etc.

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PAGE DESIGNER 2 is a radically changed and greatly enhanced commercial version of the QUANTA library's original PAGE DESIGNER (See *Info Design*, Jan/Feb 1985, p. 35). PDE requires at least 256K of additional RAM (and more is better), and its products are not compatible with the original program.

Like its predecessor, FD2 is simple to understand and easy to use. New features include the ability to store more fonts in memory, to store as many as nine (small) pages, to import QUILLE .doc files into multiple automatic or manually defined columns, new column justification options, word by character microspacing by pixel, new text and tires fonts, multi-page printing and multiple copy options, improved text typing, and many others. CUT & PASTE operations are very fast and versatile. FD2 is available from SHARE for under \$60.

## DESIGNING WINDOWS

a QL program by P. Bingham

No St. graphics discussion would be complete without mention of the St.'s marvelous windowing abilities. With the power allowed by virtue of SuperBASIC, the St. can handle many windows, treating each almost as separate screens. With all the window-specific commands available to the programmer, he (or she) has control only dreamed of in other Sinclair machines.

But during programming, the actual DESIGNING of a window usually goes something like this: 1) type in **WINDOW** command with the four parameters set! 2) realize it isn't long enough on the screen! 3) type in another **WINDOW** command! 4) now it is way too long! 5) type in another **WINDOW** command with an in-between parameter... now what was the original value? 6) start thinking about:

A couple of years ago, I ran across a little program written by James Lucy in the British publication, *PC WORLD*. *PC WORLD* is great for PC lovers and is still worth the rather steep "poor-exchange-rate-induced" price of four bucks an issue from the few U.S. dealers who stock it. James Lucy's program was a quick little window editor for monitor users. I have modified it quite a bit from the original. Illustration 11.

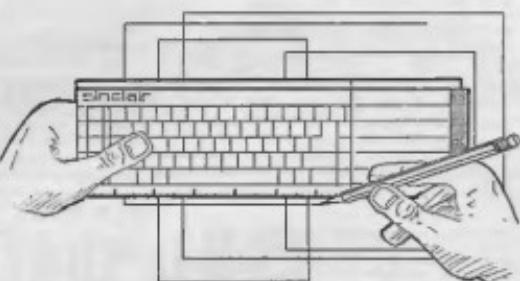
The program is simple. Just type it in as is and run it. It will draw the outlines of a window. Then by using the arrow keys, this window frame can be moved around the screen. (If you bump into the screen edge it won't go any further.) By holding the CONTROL key down, the arrow keys will cause the box to shrink or swell to the desired size. The program moves the frame in steps of seven, but for fine tuning, just hit F1 and you may proceed a pixel at a time. To set it back to seven just hit F3. When you have what you want, hit the TABULATE key and the exact WINDOW definition will be printed for you in the center of the screen. You may keep drawing overlapping window frames over each other, or just hit ESC and the screen will clear ready to go again. The program alters each subsequent frame color so you can distinguish each more easily. Once in a while, the overlapping lines cancel each other. Not to worry, just hit an arrow key or TABULATE.

Well, fire up those GIs and start some fancy window programming again now that you have no excuses! This program will help with header blocks and thin shadow line parameters as well, so go do something to make that black and white MACINTOSH screen next door turn green with envy and your cousin's BIG BLUE turn even bluer.

STANDARD 09500 OUTLINE  
BROADWAY\_ENGR DATA70  
BOLDSTANDARD COUNTDOWN  
SERIF ALUMINUMSPY TIMES

These task and times fonts are also supplied as standard with Page Designer 2. The times fonts were printed in width 1 and height 1, with proportional spacing, 2 lines per page, 110% scale and 8 point justification.

**NEXT TIME: "Upgrading Your QL," more HOT TIES and more exciting ways for your QL**



### LISTING 1

```
10 EDMark DESIGNING WINDOWS
20
30 MODE 512;WINDOW 512,280,0,0:PAPER 4:COVER-1:CLS:1:i=3:q=7
40 REPEAT new_window
50 x=40:y=10:p=30:q=20:windows
60 REPEAT outline
70 :z=CODE(INKEY$(-1))
80 windows
90
100 SELECT ON z
100 =240:c=7
110 =232:c=1
120 =208:q=s-q:IF q<0:q=0
130 =216:q=s+IF q>r>258:q=q-e
140 =192:p=s-p:IF p<0:p=0
150 =200:p=p-o:IF p>x>512:p=p-o
160 =218:q=q+o:y=y-q:IF y<2:q=q-o:y=y+o
170 =210:q=q-o:y=y+o:IF q<0:q=q+o:y=y-o
180 =202:p=p+o:x=x-q:IF x>2:p=p-o:x=x+o
190 =194:p=p-o:x=x+o:IF p<0:p=p+o:x=x+o
200 =37:RUN
210 :>windows
220 WINDOW 95,10,200,125:INK 7:CLS:PRINT x:y:p|q:
230 WINDOW 512,280,0,0:q=7:i=i+2:IF i=9:i=3
240 NEXT new_window
250 END :Select
260 windows
270 END REPEAT outline
280 DEFINE PROCedure windows
290 BLOCK x,1,p,q,i:BLOCK x,1,p,q+y-1,t
300 BLOCK 1,y-2,p,q+1,i:BLOCK 1,y-2,p+1,q+1,t
```

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\$150. Loren Latker, 10634  
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90034, (213) 558-1127.

**WANTED: BACK ISSUES OF T&C MAG.**  
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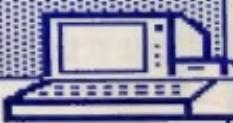
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**Colonize the Universe**

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